

A STUDY OF BATIK PRINTING ON NATURAL FIBER  
FABRICS AND THEIR DERIVATIVES

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## CHAPTER I

### INTRODUCTION

It is believed that early man decorated his skin with various stains, dyes and incisions and eventually began to use animal hides and thin layers of bark for clothing. In time, he discovered that he could make cloth from natural fibers and decorate it by applying designs to the surface using various techniques.

The batik process of printing is one of these ancient methods of applying designs to fabric. It is a wax-resist technique involving four basic steps: (1) Washing and preparing the fabric; (2) applying the designs to the fabric with molten wax; (3) dyeing the waxed fabric; (4) removing the wax and setting the dyes.

Selected areas of the fabric are blocked out by brushing melted wax over them. After the wax is applied the fabric is dyed by brushing dye over it or by dipping it into a dye bath. The waxed areas repelling the dye remain the original color of the fabric. To achieve more intricate designs with further combinations and overlays of color, the waxing and dyeing process is repeated (12).

The art of batikking is believed to have originated in Egypt, to have been carried south into other parts of Africa and east into Persia, India, Indonesia and the surrounding islands (figure 1), with the migration of traders and earlier civilizations (22). The oldest existing batik is in Japan dating from the eighth century (5). However, one must speculate that this particular batik could have been preceded centuries earlier by batiks in Egypt, Persia or India.

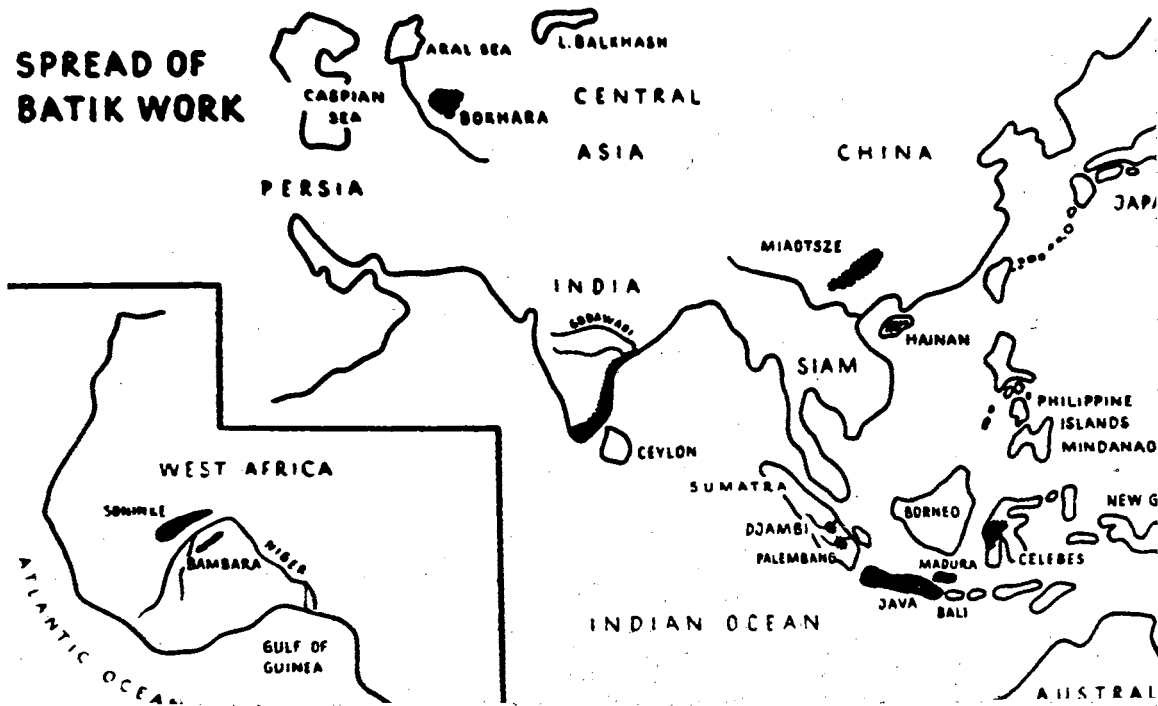


Figure 1. Map Showing the Migration of the Batik Technique (5)

During the seventeenth century, batik fabric was imported by Dutch traders into Holland (18). By the beginning of the twentieth century, batikting had been introduced into the United States, and by the 1920's the art of batikting had become the "vogue". "At that time, batik and other crafts kept decorative artists busy producing laboriously detailed ornamentation for the age of opulence (12)." Interest slackened until the late 1950's and 1960's when batikting began to reappear. The results of this later period have been much less romantic, naturalistic and detailed than those of the twenties and instead, have been bolder, freer and more spontaneous.

Since then [the 1920's] a great depression, another world war, mechanization, automation, electronic marvels, space travel and other realities of the twentieth century have affected the American attitude towards arts, crafts and the individual. Batik has come back revitalized and invigorated. It is a technique that allows simply and effectively, the production of a personal statement, a work of art (12).

Although the art of batikting is practiced all over the world, it is the Javanese in Indonesia who have preserved the technique for almost 2,000 years (22). The word "batik" is actually a Javanese word that means "to write or paint in wax" (6). It is believed that the Javanese learned the technique from Indian artisans in the twelfth century and have practiced it ever since. Barbara Yates (22) notes,

As needlework and samplers were to early American women, so written records reveal the art of batik became a hobby of the court ladies of the palace of Central Java and part of the education of any well-bred Javanese girl.

During the thirteenth century in Java, the art of batikting was declared to be a monopoly of the ruling families but as the process became more popular and the uses increased, this decree was soon broken (6).

Javanese batikked fabric is used almost entirely in the making of

clothing. In fact, the national costume of Indonesia, the sarong, is a length of batik three feet wide and six feet long. Most Indonesian women still desire to own a hand-painted garment to wear with pride on special occasions (6).

The contemporary or western style of batikting is used much more often for making accessories for the home such as wall hangings and throw pillows, rather than for making clothing. However, as will be noted in Chapter Two, the author has done a great deal of batikked clothing, which is not done in the same manner as the Javanese clothing.

Clothing made of Javanese-batikked or African-batikked fabric has been imported into this country in the past several years. In fact, the "African print" clothing which was very popular in 1966 was usually African-batikked fabric.

A detailed description of tools, processes and types of designs involved in the ancient technique of batikting and the contemporary technique will be examined in Chapter Two as well as the author's own batik techniques that she has developed and employed. Because the process of batikting is the means for executing a fabric design, the author believes that the basis for her designs should also be briefly discussed; therefore, considerations of function, fabric, technique and desired impressions (in regards to the author's designs) will also be discussed in Chapter Two.

The author's cellulosic fiber batiks will be examined in Chapter Three, while protein fiber batiks and blends will be discussed in Chapter Four.

Because few books exist on the art of batikting and because these

do not discuss specific examples and results to any degree, the author feels that a discussion of her batikting results can be extremely valuable to persons interested in this area. Through a study of this type, the beginner can gain insight into some of the technical skills required to do batikting. He can learn how certain fabrics react to this process, the unexpected results and characteristics of the batik technique, and how to plan and design with these in mind in addition to considerations of visual design and function.

## CHAPTER II

### BATIKKING TECHNIQUES

As Chapter One noted, there are basically four steps involved in the batikking process: (1) Preparing the fabric; (2) waxing the design; (3) dyeing the fabric; (4) removing the wax and setting the dye. There are also two classifications of batik techniques based upon the type of designs executed and the methods for applying the designs: the ancient, traditional Javanese technique and the contemporary western technique.

#### Ancient Javanese Technique

##### Design

Javanese batiks done by the ancient technique are immediately recognizable by their intricate, elaborately-detailed linear designs, originally derived from nature (figure 2). Gradually as the Javanese came in contact with other cultures of Asia, other forms were added altering the original designs. The designs used in Java today are combinations of traditional Javanese designs (geometrical), Indian (floral), Chinese (animistic) and other more ancient designs; they are combinations of royal family designs, mythological or historical designs and holiday designs determined by local customs (6,12). Certain of these combinations have become formalized with their own names such as the "fire tongue" form and the "plant" form (figure 3).

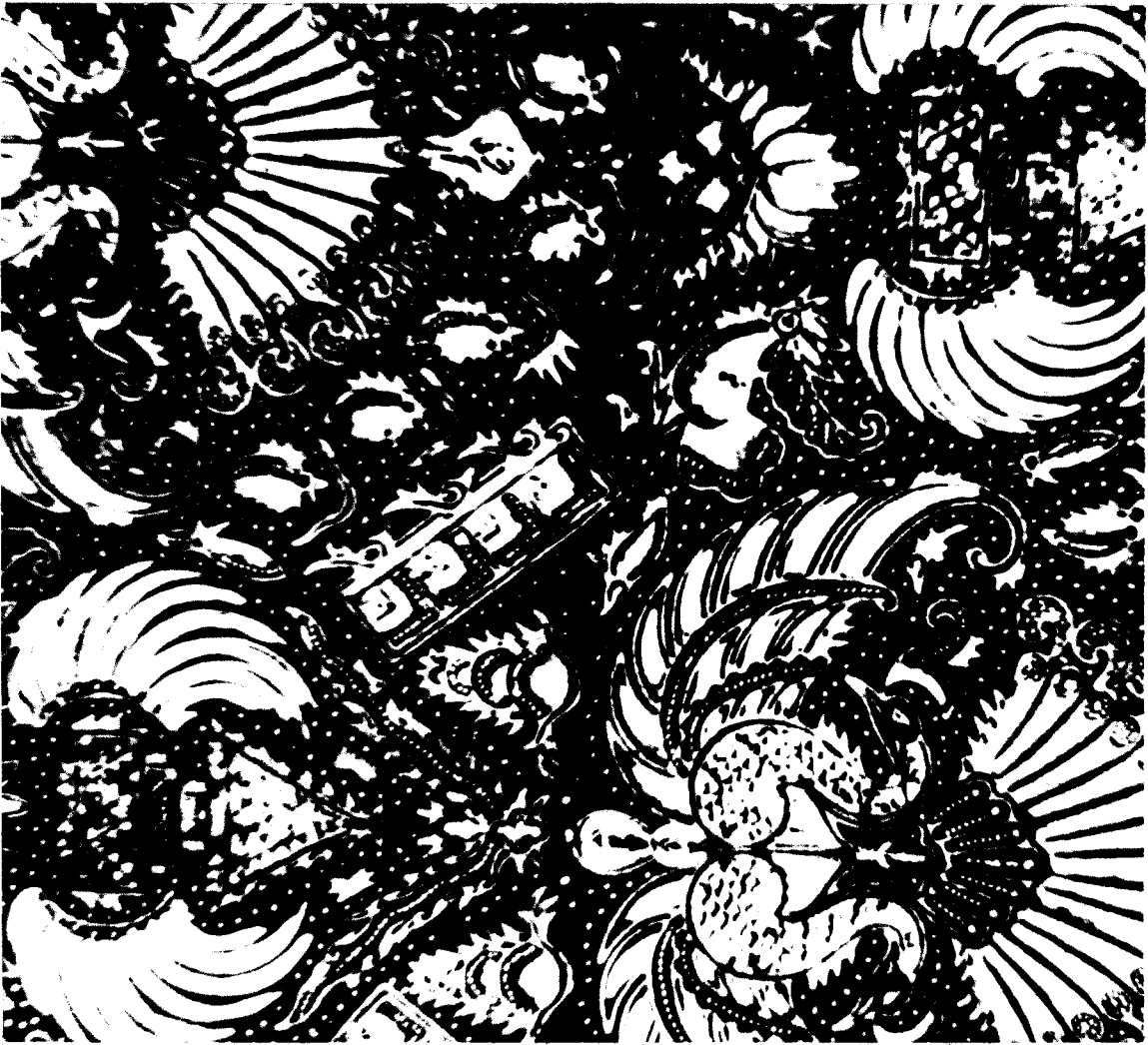


Figure 2. An Example of Javanese Batik Design Showing the Intricacy and Elaborateness of Their Patterns (5)



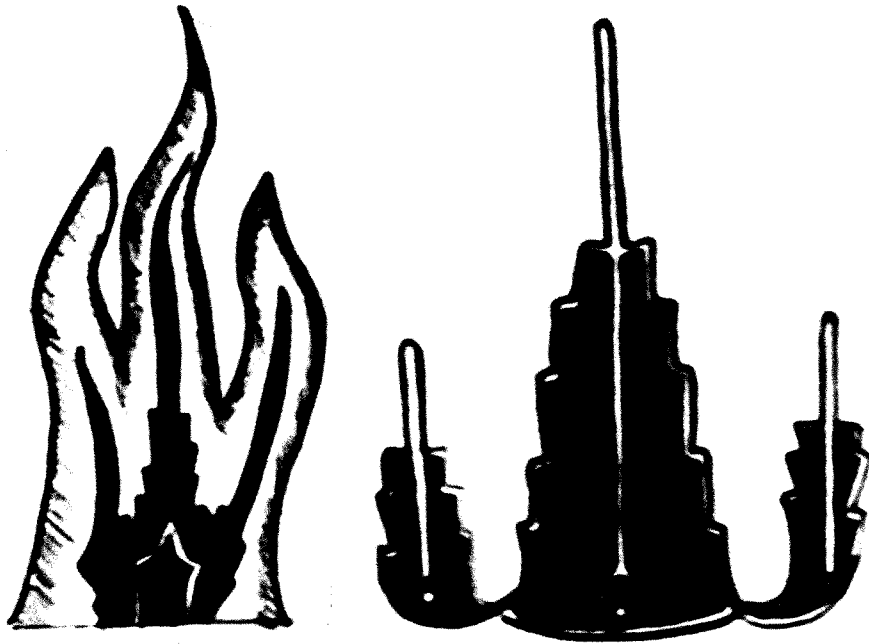


Figure 3. Formalized Javanese "Fire Tongue" Design and  
"Plant Form" Design (6)

### Fabric

Most Javanese batiks are done on natural-colored cotton cambric which is washed in hot water to pre-shrink it and to remove any filler. It can then be soaked in peanut oil, coconut oil or castor oil and kneaded with the hands and feet as many as two to five times a day for six to twelve days or as long as a month (22). This process allows the fiber to accept the dye more readily. The fabric is then boiled in water to separate any unabsorbed oil from the fabric and then beaten with wooden paddles to make it supple and to realign the weave. Next, a rice starch is applied to the fabric to prevent the wax from running.

### Transferring the Design, Waxing and Tools

Once these steps have been completed and the design has been sketched on the fabric in charcoal, the design may be applied to the fabric in two ways: (1) "tulis" or hand drawn; (2) "tjab" or stamped. If it is to be a "tulis" batik, the fabric is hung vertically on a wooden frame to have the design hand drawn on it by a young woman using a "tjanting" tool. This tool is approximately four to five inches long and is comprised of a bamboo handle attached to a copper or bronze bowl with one or more tiny tubular spouts (figure 4). The bowl is made of copper or bronze because these metals are good conductors of heat and allow the wax to stay fluid longer. The part of the fabric to be waxed is supported by the batik artist's left hand and with the right hand, the "tjanting" tool is dipped into a iron pot containing liquid wax. She then proceeds to cover the parts of the design not to receive any of the first color of dye. The wax runs through the tubular spout(s) from the bowl allowing the artist to "write" with the wax forming some

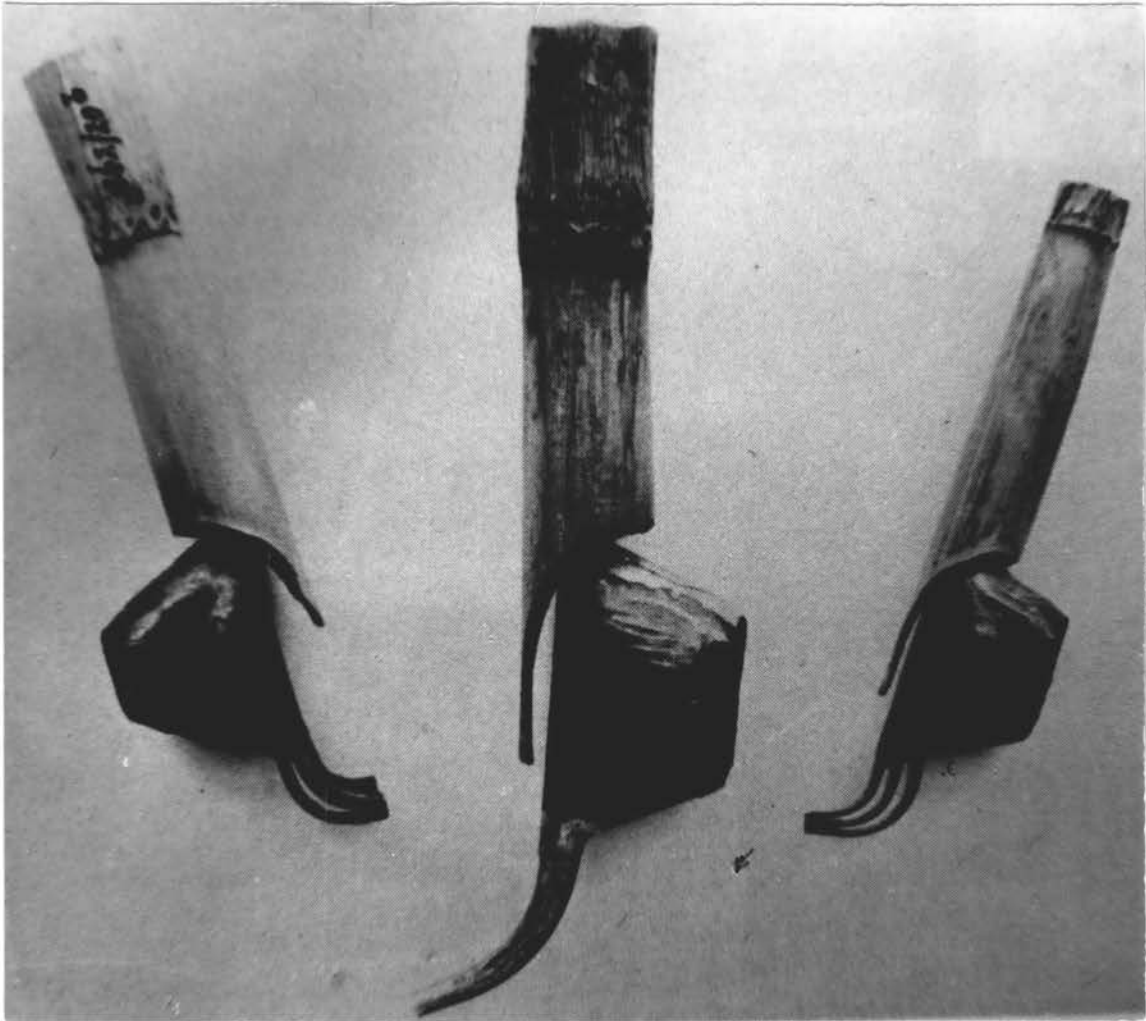


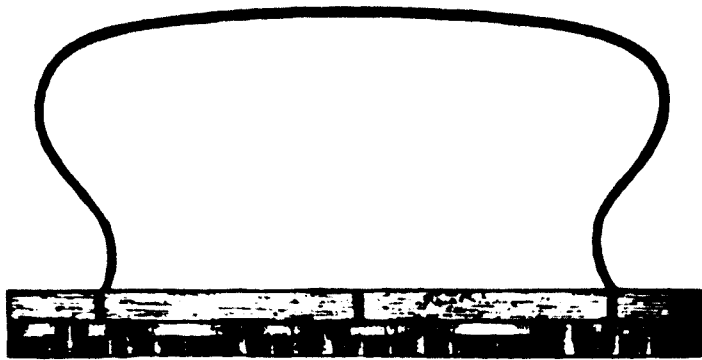
Figure 4. Javanese "Tjanting" Tools (12)

lines as thin as one-twenty-fifth of an inch. The multiple-spouted tools produce dots or parallel lines. An ancient written batik often required a year to complete and even today a two yard long "tulis" may take 30-50 days to complete (12). Hand-painted batiks cost between \$30 and \$60 each.

Because the "tulis" technique of batikking is very time consuming and expensive, copper hand stamps, "tjabs", (figure 5) composed of repeated single designs (geometric forms or stylized natural shapes) were introduced into Java in 1850 from Madras, India (12). This technique is done exclusively by men and requires that the fabric is in a horizontal position. The "tjab" is pressed onto a pad saturated with molten wax and then pressed on the cloth. The fabric must be stamped on both sides, thus matching the design requires great skill. Still, as many as 20 "tjab" batiks may be done in one day and the cost is four to ten dollars each. Today, approximately 250,000,000 Indonesian workers produce 40,000,000 yards of "tjab" batikked fabric a year (12).

#### Types of Waxes and Dyes and Dyeing Procedures

The wax formulas used by the various artisans of either technique include combinations of paraffin, beeswax, resin, varnish gums, and tallow. The dyes used in most large scale produced batiks are aniline dyes; however, the use of locally-made vegetable dyes are still used by artisans in the royal center of central Java, Jogjakarta and Surakarta and other large Javanese cities (22). Historically, three plant dye colors were used for batikking in Java: indigo blue, red and yellow. Originally, only blue on white was used then the royal colors of red and yellow were added in the thirteenth century. Most Javanese batiks



The sketch of stencil showing bird and flower design.



Figure 5. Javanese "Tjab" Stamp and Design (5)

today employ only two dyeings--shades of indigo blue and a reddish brown. The shades of these colors vary in different regions; generally, the North Javanese colors are brighter and more intense than the South Javanese colors.

Indigo blue is usually the first large vat of color into which the batik is immersed. The batik is hung vertically immediately from the dye bath and when this shade has dried, portions of the first wax design or all of it can be scraped off exposing white areas to the next dye. The areas to remain white or blue are re-waxed. The fabric is then immersed in the next shade, usually the reddish brown dye made from the sago tree of Borneo (12).

#### Wax Removal and Dye Setting

When this second and often final color is applied, the batik is again hung up to dry. When dry, the fabric is boiled in water to remove the wax. This procedure also sets the dyes.

### Contemporary Western Techniques

#### Design

Western, contemporary batiks are usually of a character quite different from those done by the Javanese. The intricate, line-drawn Javanese batiks are much too specific and exacting for the Western artist's taste and much too time-consuming. He prefers to design freer, bolder, more original patterns (figure 6); he usually never employs formalized, historical designs as the Javanese do. Western batik artists also use "crackle" in their designs. "Crackle" can be achieved in batikking when the flattened waxed cloth is crumpled or cracked by



Figure 6. An Example of a Contemporary Batik by the Author

various means, and placed in the dye allowing it to penetrate into these cracked areas forming beautiful spider-web-like lines (figure 7). To the Javanese, "crackle" is a sign of poor workmanship and it is almost never seen.

When one is doing a batik, it is very difficult to determine the type and degree of "crackle" one is getting. One can get a better idea if the waxed cloth is held up to a strong light allowing the fine "crackle" to be silhouetted and more easily seen. If the designer must dye in small pans but wants to try to keep "crackle" in certain areas, it helps slightly to heat the waxed fabric until it is warm, which will allow for bending more easily without the wax cracking. The ideal situation would be to have a special wax formula with very high flexibility for those areas where little or no "crackle" is desired. By waxing over an already waxed, "crackled" and dyed area, then re-crushing that area and dyeing it again, the author can get a wonderful double "crackle" effect.

### Fabric

The selection of fabrics on which the contemporary batik artist can work is quite vast. Usually, the fabric is white or of a light value in order to allow for as great a number of colors as possible to be dyed. Although silk is often considered as the batik fabric, all natural fiber fabrics and some synthetics can be batikked (unless treated to repel liquids). In Chapter Three and Four, the author will discuss each type of fabric that she has used and will note the characteristics of each.

### Transferring the Design and Waxing

Once a fabric has been chosen, the artist may either work out a design on paper and then draw it on the fabric with charcoal pencil or he may prefer to simply begin applying wax without a preconceived sketch





Figure 7. An Example of "Crackle" Visual Texture

or idea, and work intuitively. The wax is applied first to those areas to remain the lightest color.

Unlike the Javanese, the western batik artist does not normally batik fabric by the yard. As stated earlier, he either designs and batiks decorative accessories, such as wallhangings and pillows, or he batiks clothing. In her own decorative accessory designs, the author does not usually know the end site for her batiks; therefore, she can only consider the degree of visual interest and stimulation she seeks to create in the batik. Once these factors are determined, she then selects a fabric appropriate to both the design and the technique and proceeds to draw the design on the fabric.

For the type of clothing worn in western cultures, the author does not believe that using fabric batiked by the yard is the way to create a well-designed entity; however, fabric batiked by the yard may create a well-designed garment such as the sarong.

When batikking clothing, the author first selects a garment pattern that has suitable cut and details which can be rendered successfully into a batiked article. She has found that dresses with simple lines are best for being batiked because the print and the dress seem to compliment each other rather than compete. Once the dress pattern is selected, and a fabric selected appropriate to the pattern as well as to the technique, the batik design is then developed.

The author lets the line and cut of the dress, the "character" of the fabric, and the person for whom it is intended, suggest the appropriate design. The pieces of the pattern are then cut out, and front or back darts, seams, zippers, or other basic constructions put in the garment. The author uses nylon zippers the color of the original

fabric; these have always dyed and have not been harmed by application or removal of the wax.

After those constructions mentioned above have been done, the author has a separate finished front piece, back piece, sleeves and any small items such as facing and belts (figure 8). At this point, the design is then transferred to the fabric in the same manner discussed for wallhangings. By having already put in the darts, zipper and other constructions, the design goes directly over these points without affecting the design. Great care must still be given to matching the design at the seams that have not been sewn. Following these steps, the first layer of wax is then applied.

### Tools

Most batik artists use double boilers in which they melt their wax. A hot plate or a stove is required on which to place the double boiler and the author strongly suggests the purchasing of a hot plate unless one would be working directly beside a stove. The water in the double boiler must be near-boiling or boiling constantly to keep the wax liquid and hot enough to penetrate the fabric. If the wax only penetrates the upper surface but does not go completely through the fabric to the back, the dye will change the color of the fabric on the back in those places and, consequently, change the desired effect. The degree of thickness of the wax in various places can also cause the dye to take differently; however, these results are usually much more subtle than if no wax at all had been on an area and can cause very interesting effects.

Some artists stretch their fabric over a wooden frame before waxing; however, the author has never done this. Instead, before the wax



Figure 8. Front Section of Dress with Design Sketched On

is applied to the fabric, a bed of newspaper is placed on the surface where one will be working. Next a layer of clean newsprint is added. The fabric is then placed on the clean newsprint for the waxings. The author usually holds a small, aluminum foil plate in her left hand to catch any unwanted wax drippings that may fall from the brush or "tjanting" tool in her right hand. By waxing the fabric flat on the paper and having the wax cool in the fabric causing the fabric to stick to the paper, certain delightful types of "crackle" can be achieved when the fabric is pulled up from the paper.

The western batik artist prefers to use brushes of all varieties to apply the molten wax and only occasionally uses a "tjanting" tool to apply fine line work for contrast with larger more open areas. The "tjanting" tools that can be purchased in the United States are basically constructed in the same manner as the Javanese tool, except the copper spout and bowl are replaced with a brass bowl and spout which is more elongated resembling the shape of the handle (figure 9). "Tjanting" tools with double spouts, are not found in this country.

#### Types of Waxes

It is obvious that unlike the Javanese, the Western batik artist is not bound by any tradition or special way of doing batiks. The author feels that because the processes employed by the western batik artist vary from artist to artist, and because of his sensitivities to any particular part of the process (waxing, dyeing, etc.) the batiks of each person are quite different in design, color and character.

The types and amount of wax each person uses vary drastically. For example, before the author started to batik, she had read that one part paraffin to five parts beeswax gave a wax mixture with enough

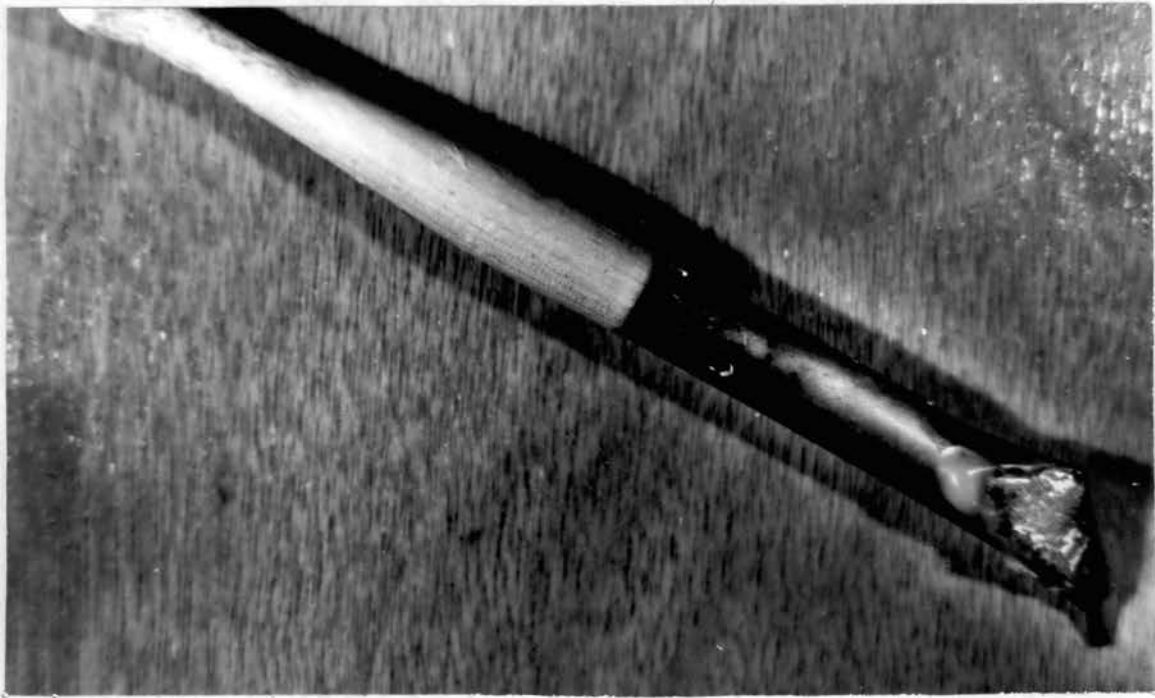


Figure 9. An Example of a "Tjanting" Tool Made in the United States

brittleness to give a good "crackle" (18). She had also read that equal portions of each are appropriate for large areas (12). When one reads something like this, one is not certain of the melting points of these particular waxes or the degree of pliability of the wax or any other factor which would help one select similar waxes. Usually pure beeswax is very sticky and pliable where regular paraffin that can be purchased at grocery stores is very brittle. When first starting to batik, the author tried a mixture of 100 per cent regular paraffin but soon found that this mixture was much too brittle. When handling the fabric, the wax tended to crack-off allowing for too much dye penetration and consequently, mottled, ruined designs (figure 10).

When checking the price of pure beeswax, the author found it to be approximately four times as much as paraffin and decided to find a substitute. A natural, "plastic" wax known as Ultraflex with a melting point of 143 degrees was found. Its cost is approximately ten cents a pound more than paraffin. This wax was suggested to the author for a property it possessed similar to the one for which beeswax is used in batikking--flexibility. The author now uses a wax mixture of four to one parts of paraffin to "Ultraflex". It is particularly important that one does not change wax formulas in the middle of a design because entirely different effects can be the result. For example, the front of a dress waxed with one formula could be entirely different from the back waxed with another formula (figure 11).

The author has found that the wax mixture mentioned above is suitable on all fabrics she has used. The specific types of "crackle" and other wax effects which developed on the different fabrics will be discussed in Chapters Three and Four.

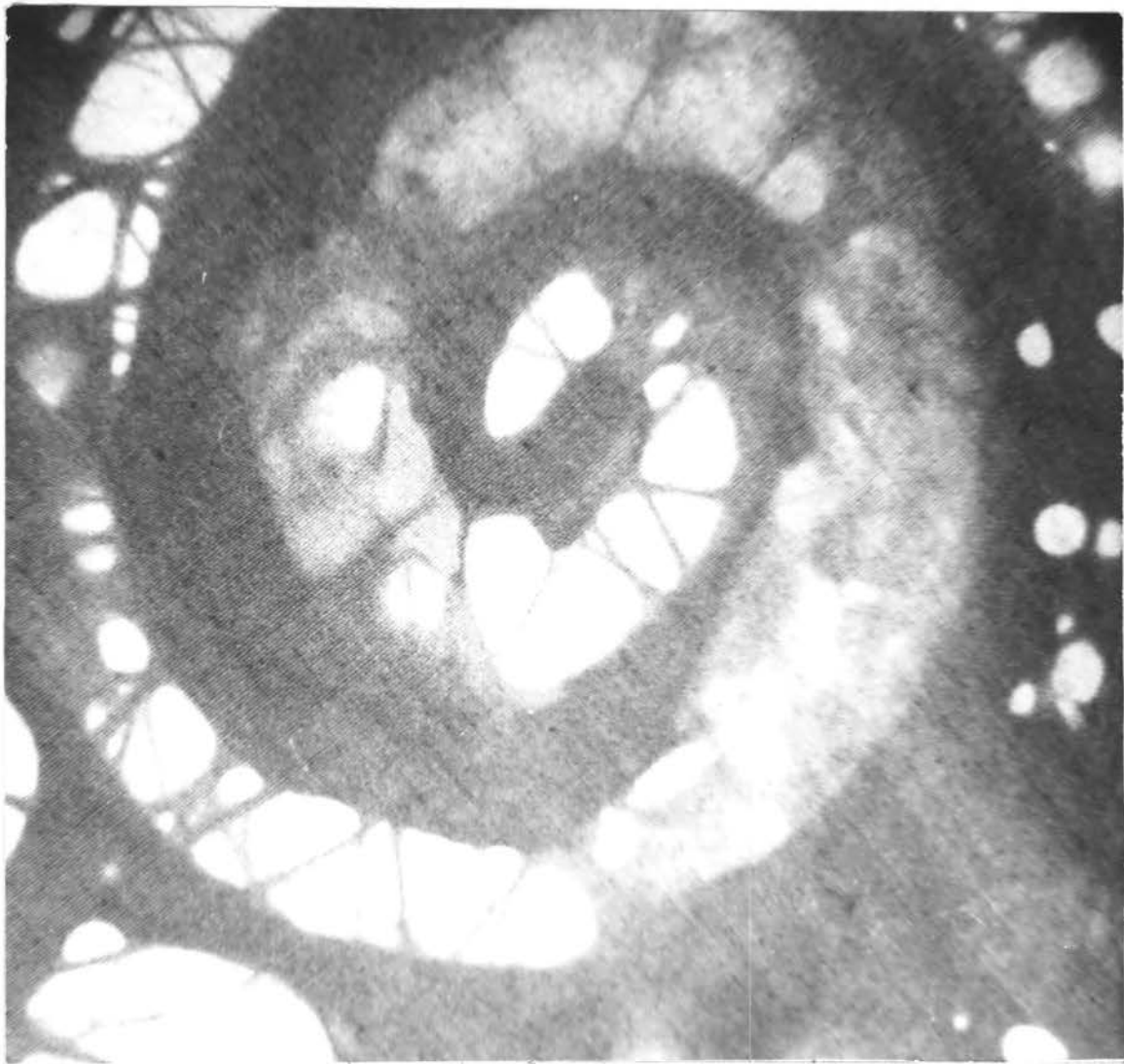


Figure 10. One Hundred Per Cent Paraffin Wax Formula Results





Figure 11. The Two Photographs Above Show the Results of Changing Wax Formulas During A Design.

### Types of Dyes

Many types of dyes are used by the western batik artist--vegetable, aniline, household dyes and special batik dyes; however, household dyes are probably used most frequently. Although the author uses a small amount of aniline dyes, she relies mostly on regular household dyes. The author has found in these experiments that Putnam dyes offer a large variety of colors which run very true to the color shown on the packet. These dyes come in small gelatin packages which when dropped into near-boiling water dissolve immediately. Rit and Tintex dyes have also been used by the author and although they mix and dye quite well, she prefers Putnam colors because of the subtle, neutralized shades they offer (henna, bronze green, mulberry). Very nice shades may also be purchased in the aniline dyes; however, the author was only able to purchase these in pound cans for approximately four dollars a can and found this method to provide too much dye of one color and to be too expensive for this study.

The author normally mixes her dyes hot and then lets them cool. She has found that two packages (of any of the three household dyes mentioned above) mixed in 21 cups of water will provide a minimum amount of dye with which to work. Twice this amount (approximately two gallons) is usually needed for bulky, heavy or absorbent materials such as velveteen. The author normally starts with white or light shades of fabric and has found that this dye formula is strong enough to dye most fabric rather rapidly. Occasionally, the author has started with a piece of fabric of medium value or slightly darker (emerald green) and has found that in order to achieve enough contrast between the color (deep blue) used to dye over this shade, she has had to use three

packages of dye to 21 cups of water.

When using analine dyes, the author usually uses two tablespoons of dye to 11 cups of water. In the mixing of the dyes it is good to test the fabric which one will be dyeing. Remember that hot dyes will tend to dye the fabric darker and faster than will cool ones.

### Dyeing Process

Once the dye has cooled, it is placed in pans (if it was not mixed directly in the dye pan) and the waxed fabric is then placed in the dye bath. (A discussion of how the various fabrics react in dye will be discussed in Chapter Three and Four). Rubber gloves are essential when dyeing.

Various types of non-metal pans can be used for dyeing. One of the most inexpensive types is the porcelain enamelled pan. These pans will not chemically affect the dye nor will they become easily stained. If stained, most powdered cleanser bleaches can remove it. Glass and stainless steel vessels may also be used as well as certain hard rubber or plastic pans. The author has found that some hard plastic or rubber oval tubs suitable for baby bath tubs serve very well as dye pans. The author uses both the circular enamelled pans and the oval rubber ones. She would suggest that the person starting in batikking purchase pans at least twenty inches in diameter or larger. This size pan is minimal and often can cause a batik to get "crackle" where the artist may not have wanted it because the fabric must be crushed to get it into these pans.

Once the piece has achieved the desired color (remembering that it is approximately one shade darker when wet than dry) the author then hangs the piece up to dry. A plastic closeline should be used in place

of metal because the metal one can discolor the piece. The batik should never be wrapped and pinned over the clothesline because a line will show. Although most sources suggest rinsing the piece in water at this point, the author allows the dye to dry in the fabric as the Javanese do, and she has found that one can get darker more vivid colors in this way. If the piece is to be a dress, it is then rinsed and allowed to dry. When the piece is thoroughly dry, the next waxing takes place. If the piece is not completely dry, it will cool the wax and not allow penetration.

Often when wax is applied over fabric that has not been rinsed, some of the dye will appear in the wax as it is brushed on; however, this does not harm the color or design.

Once a dye has been used, it is not necessary to throw it away. When thin, plain woven fabric is used, very small quantities of the dye will be used. The author stores at least 20 gallons of different colors of dyes in plastic gallon milk bottles. Most of the dyes the author uses have stored for months at a time without any apparent loss in strength or change in color. Occasionally, the bronze green and mulberry Putnam dyes will turn brown after a period of a month-and-a-half and must be thrown away. Keeping the cold dyes already mixed and on hand is a tremendous timesaver. It allows one to always have dyes on hand immediately whenever ready without having to mix the dye and wait an hour or more for it to cool.

The western batik artist not only applies the dye to the fabric by immersion but also applies dye by brushing it on. Dyes are brushed on when the artist wants more colors than he could achieve by dipping and dyeing over colors, when he does not want to remove the wax each time,

and when he wants to use complimentary colors. If the compliment of a color were to be dyed over that color, because of the transparency of the dye and the reaction that occurs when mixing complimentary colors, the first color would become neutralized. For example, red dyed over green would turn brown, or purple dyed over yellow would react similarly; therefore, it is absolutely imperative that a batik designer have a knowledge of color or else he will probably have many sad, discouraging results.

When brushing dyes on, the author has found that concentrated mixtures of approximately one teaspoon to one cup of water gives best results on most fabrics. The author has fewer problems of the dye bleeding or running into an area where it is not desired, if the area where the dye is to be brushed on is outlined with wax first. The wax will contain the dye in most instances, preventing bleeding. The author finds that if she waxes the lightest area first, trying to plan for this color to outline the brushed-on areas, then proceeds to brush on the desired colors before continuing with other dyes, the results are much more successful.

By brushing dye into a particular "crackled" area, then rewaxing over that area, the artist can have greater control over the color of his "crackle".

The author has also found that felt tip pens are good for applying small areas of accent colors; however, these can be removed by dry cleaning.

Other batik artists suggest water-proof inks (12) or screen printing dyes (21) for brushed-on areas of color.

### Wax Removal

After the final dye has been applied and the piece is completely dry, a padding of newspaper is again put down, then clean newsprint, then the waxed fabric, then another sheet of newsprint. A very hot iron is then pressed across the top piece of newsprint causing the wax to melt out of the fabric and be absorbed by the paper. At this point some dye will also come out into the wax; the finished batik is not affected by this. New pieces of newsprint are put down as needed. When as much of the wax as possible or as desired is removed from the piece, it can be mounted as a wallhanging. If the piece is to be a dress, it must be dry cleaned or dipped in white gasoline to remove the wax completely.

The author very often leaves a small portion of the wax in a wallhanging by only ironing out the wax. This procedure tends to intensify and deepen colors on fabrics that have a tendency to be dull (muslin, interfacing, etc.) and it also adds "body" or stiffness which is sometimes desired.

After a batik has had the wax ironed out and it is dry-cleaned it will consequently, look lighter than when it had wax in it. Some dye will come out in the dry cleaning fluid if the dye has not been rinsed out, but this is not the reason for the piece looking lighter. It is actually the same shade as it was when dry and before it was waxed; the wax having been removed is simply allowing it to return to this original dry shade (figure 12).

When making a piece of clothing, it is always dry cleaned before being lined and completed.



Figure 12. Samples Showing Fabric Before Waxing, With Wax, and After the Wax Is Removed

### Dye Setting

The author has found several techniques for setting the dye but has not used all of them. She has worked with acetic acid (vinegar) which is used to dampen a cloth which is then placed over the batik and ironed, steaming the solution into the batik. This technique appears to slightly brighten the colors of batiks on most fabrics but appears to be a particularly good technique for silk. G. S. Fraps (8) notes,

Silk is usually brightened or given the "scoop" feeling after dyeing, by working it in a dilute solution of acetic, sulphuric or tartaric acid for some time. Tartaric acid gives the best results. It [the fabric] is dried without rinsing. The affect of acetic acid disappears after a time, but that of the others is permanent.

Therefore, although one normally has acetic acid on hand, better set dyes would probably be the result if one were to purchase sulphuric or tartaric acid.

The author has also added plain household salt to the dye bath to act as a mordant; however, in most household dyes, salt is already added.

Another technique the author has found mentioned quite frequently in dye books, is that of Tannin-Mordants. Basically, after dyeing the fabric, it is placed in a five per cent solution of tannic acid for a period of time, then without rinsing, it is placed in a solution of tartar emetic. The fabric is then removed and rinsed quite thoroughly. It is very important to rinse out the tartar emetic because it may produce blood-poisoning if it comes in contact with the skin (8).

Barbara Yates (22) notes that by dipping the batik in a lime and alum solution, the dye may also be set.

And still a final method mentioned, is the setting of dyes under



steam pressure(21). If one has his batiks dry-cleaned professionally, then the dry cleaners will steam the piece when pressing them.

Basically, the author feels that the area of dye setting in regards to batik is still very tentative and much research and experimentation needs to be carried on in this area.

## CHAPTER III

### CELLULOSIC FIBER BATIKS

In this chapter, the author will discuss individually those fabrics that she has batikked which were made of the following cellulosic fibers: cotton, flax, jute and rayon. Cellulose is the basic material of all plant life. Rayon contains 100 per cent cellulose, cotton approximately 91 per cent, and flax about 70 per cent (9).

#### Cotton

The largest percentage of fabrics that the author has batikked have been those composed completely of cotton fibers. They include: wallpaper canvas, Sänperk interfacing, voile, sheer ribbed cotton, unbleached muslin, percale, sateen, polished cotton, pique', sailcloth, homespun, osnaberg, felt, terry cloth and velveteen.

#### Wallpaper Canvas

The term "wallpaper canvas" is a name given to a plain weave, light weight, natural colored, sheer cotton which comes in several grades and in the past has been used almost exclusively as a backing for wallpaper (figure 13). The best grade normally costs twenty-two cents a yard and it comes in 36 inch widths and is not pre-shrunk. The author has used this fabric most often for batikking wallhangings and for lining dresses.

If the fabric is first washed to preshrink it and to remove a sizing that comes in it, and then ironed to give a smooth, unwrinkled surface for waxing, this fabric will work marvelously for batikking. On all of the fabrics to be discussed, the author normally uses one part Ultraflex wax to four parts of paraffin. With wallpaper canvas she has always had excellent wax penetration without any difficulty of the wax flaking off during handling; however, due to the great absorbency of this fabric, the wax will tend to run slightly when it is applied. When using her regular dye formula mentioned earlier in Chapter Two, the wallpaper canvas has dyed very quickly (two to five minutes) and with quite intense colors (figure 14). Dyes will also brush on quite well but have a tendency to "bleed" if not contained between waxed areas.

Because of the thinness of this fabric, when it is waxed it is still rather pliable; therefore, one can fairly easily place "crackle" where desired without too much extra, unplanned "crackle" occurring. As mentioned in Chapter Two, when this fabric is waxed flat on layers of newsprint and the wax is allowed to cool and harden sticking the fabric to the paper, a very fine linear "crackle" can be obtained when the fabric is pulled up from the paper. This very delicate "crackle" will show on this sheer material where it would not on heavier fabrics.

If a small quantity of wax is left in the fabric, the colors will be more intense and the fabric will have a stiffness to it. However, during the batik process the fabric probably will have gotten off-square and if wax is left in the fabric it is very difficult to get square. If the fabric is dry-cleaned, it has an extreme softness, and drapeability to it which is a desirable quality for both wallhangings

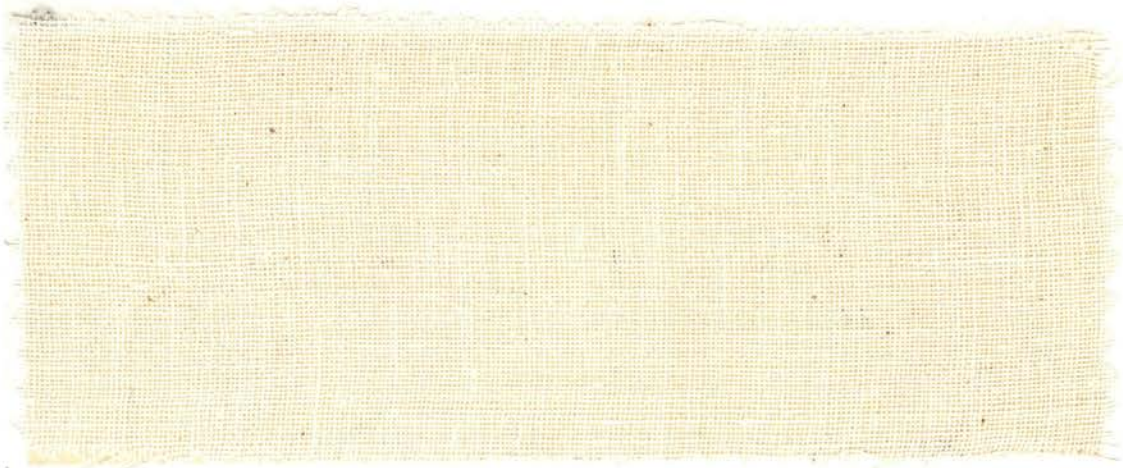


Figure 13. Plain Wallpaper Canvas Fabric

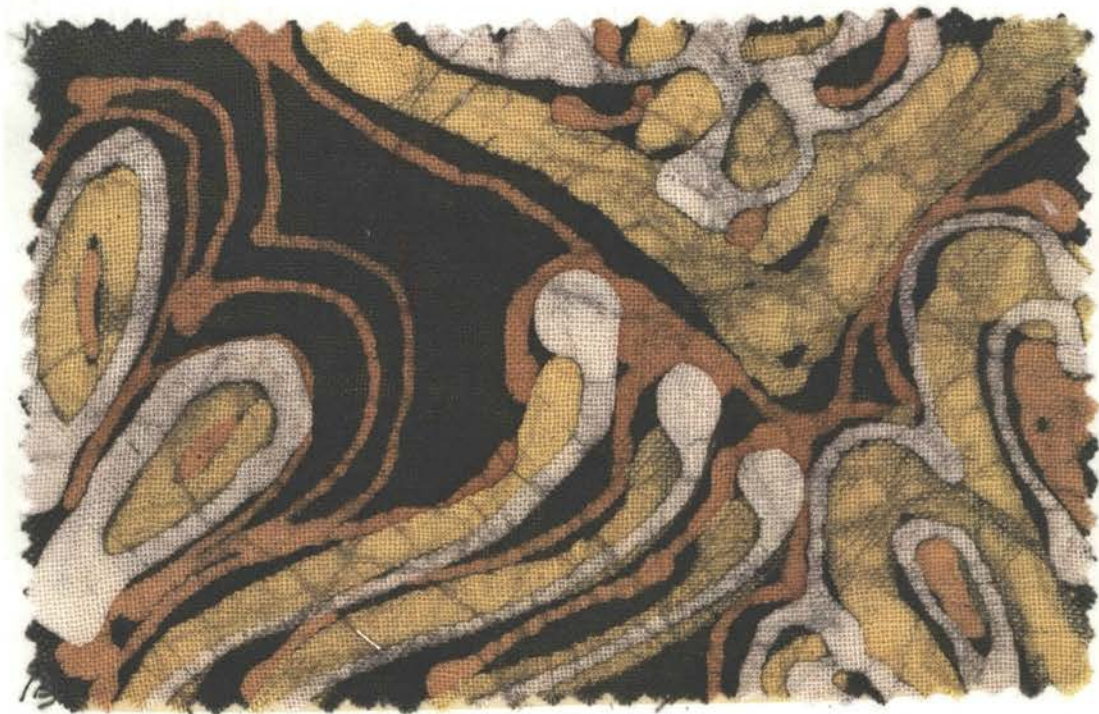


Figure 14. Batiked Wallpaper Canvas Fabric

and clothing; however, this fabric does wrinkle badly.

Generally, wallpaper canvas dyes quickly and intensely, gives a good "crackle", is inexpensive and is an easy fabric with which to work.

### Interfacing

A fabric very similar in many ways to wallpaper canvas is Sanperk interfacing. This fabric is also a plain weave sheer, 36-inch width cotton fabric; however, it is more tightly woven and smoother than wallpaper canvas and is already preshrunk and comes in white, natural or black. It normally costs approximately sixty cents per yard (figure 15).

Unlike wallpaper canvas, it is not necessary to wash this fabric before starting. The author has put it directly into the dye without pre-treatment and it has dyed nicely. However, a sample should always be tried first to see if it will accept the dye without having to be washed.

Sanperk interfacing reacts to the wax and dyes in the same ways mentioned for wallpaper canvas and it is generally a good fabric for batikking (figure 16).

### Voile

Voile is a crisp, sheer, lightweight fabric also of plain weave (figure 17). It is less crisp than organdy but more crisp than wallpaper canvas or the Sanperk interfacing. Voile may be 36 inches or 45 inches wide and may come in all colors and prints. The price is approximately three times as much as the interfacing.

The author has batiked voile dresses and scarves and has had less problem with wax spreading than with the two previously mentioned fabrics, but many more problems with dyeing (by either the dipped or brush-

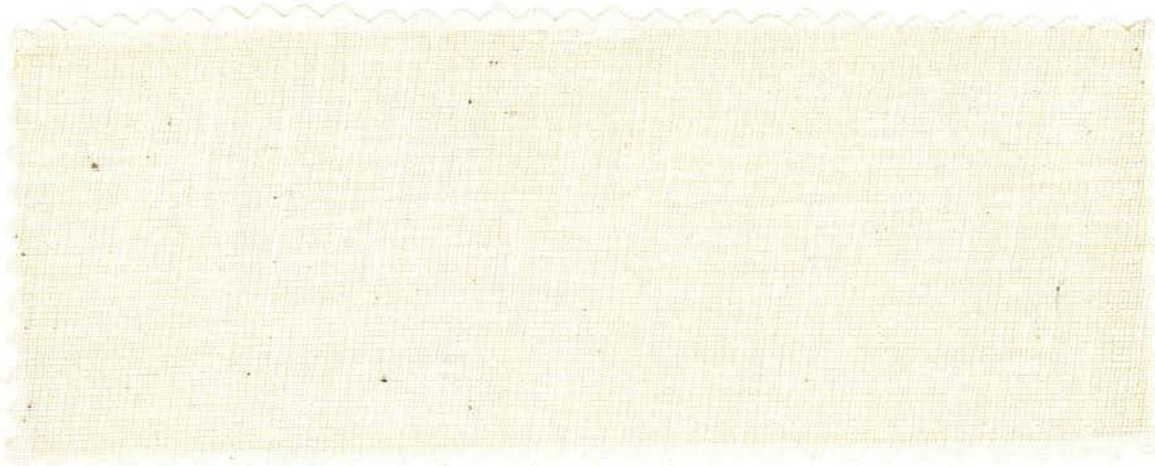


Figure 15. Plain Sanperk Interfacing Fabric



Figure 16. Batiked Sanperk Interfacing Fabric

ed technique). Deeper degrees of intensity and value attained with wallpaper canvas or interfacing have been unattainable with the voile she has used when it was left in the dye for much longer periods of time. Consequently, the author has been unable to get as much obvious "crackle" with voile as with the other two fabrics. The author has found, however, that the moire' effect of the voile fabric works beautifully with the batik technique.

Although the author has achieved heather-type colors instead of intense ones when working with voiles, she feels through further experimentation the darker, more intense colors could also be obtained. The very soft heather shades, however, make a beautiful batik (figure 18).

#### Sheer Ribbed Cotton

Another sheer white cotton with a slight crosswise rib has been batiked by the author. This fabric is much more tightly woven than any of the other three fabrics mentioned and the horizontal ribs add a subtle texture (figure 19). It also is 36 inches wide and the author has paid approximately one dollar a yard for it.

This fabric waxes easily although the wax does run slightly more than on the voile. It also dyes easily with both the dipped and brushed technique, and gives a fairly crisp-looking "crackle".

Due to the closeness of the weave and the smoothness of the surface, this fabric is visually more like voile, but would be classified as reacting to the batik technique somewhere in between the first two sheer cottons mentioned and the voile (figure 20).

#### Unbleached Muslin

Unbleached muslin is a plain weave, natural colored cotton fabric

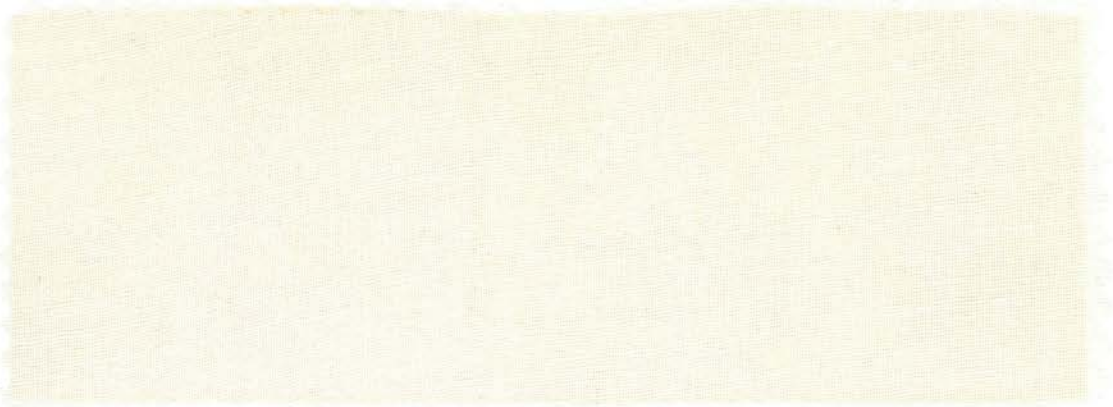


Figure 17. Plain Voile Fabric



Figure 18. Batikked Voile Fabric



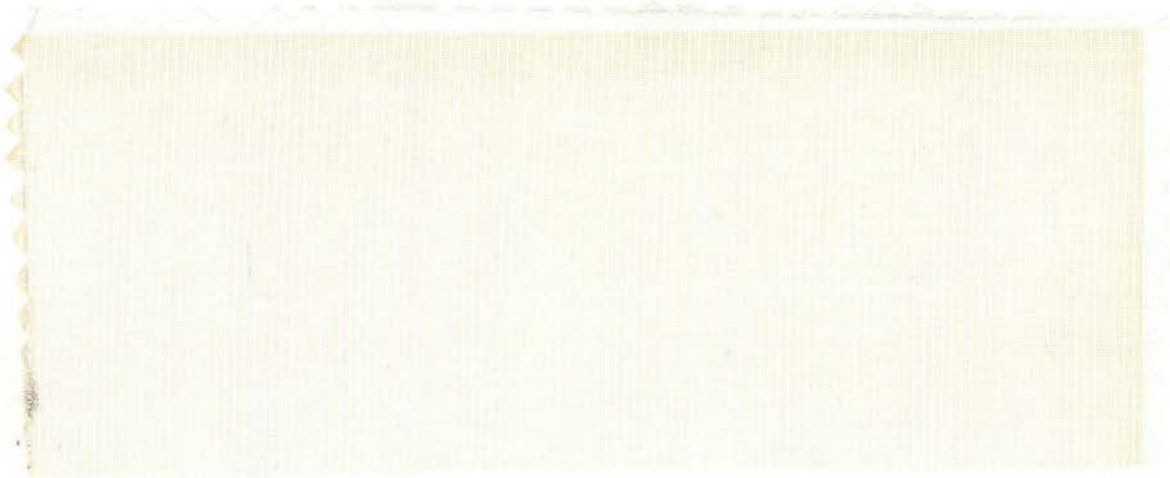


Figure 19. Plain Sheer Ribbed Cotton



Figure 20. Batikked Sheer Ribbed Cotton

which normally costs about thirty-five cents a yard (figure 21).

Most muslin contains starches or fillers which means that they must be removed by washing if the fabric is to be dipped into dye, or else the dye will tend to adhere only in certain spots causing an uneven dyeing. When this filler is washed out, the fabric will dye quickly and with good depth of color.

However, muslin that has not been washed is excellent for brushing on dye because the dye will not "bleed". It can be applied just as paints would be; one color can be brushed-on directly next to another color that is not waxed without any running of colors. The concentrated dye must usually be brushed on the top side several times then the piece must be turned over and the dye applied to the back because the dye will also not penetrate the fabric when it has the filler in it. (figure 22).

This characteristic of muslin allows for many colors to be brushed onto different areas without waiting for one color to dry and be waxed, before another can be applied.

As noted in Chapter Two, the procedure of brushing-on the dyes also allows the artist to generally get more colors than he could possibly get by dipping the fabric. However, even when most of the colors are brushed on, the author leaves the darkest color to last and then dips the almost-completely waxed piece into this shade. The dye unifies the piece by distributing its color throughout the "crackle". The actual "crackle" of muslin can vary from a rather soft-looking one to a fairly sharp precise one.

Due to the dull appearance muslin has, if the wax is only ironed out leaving a portion of the wax in the batik, the fabric will obtain

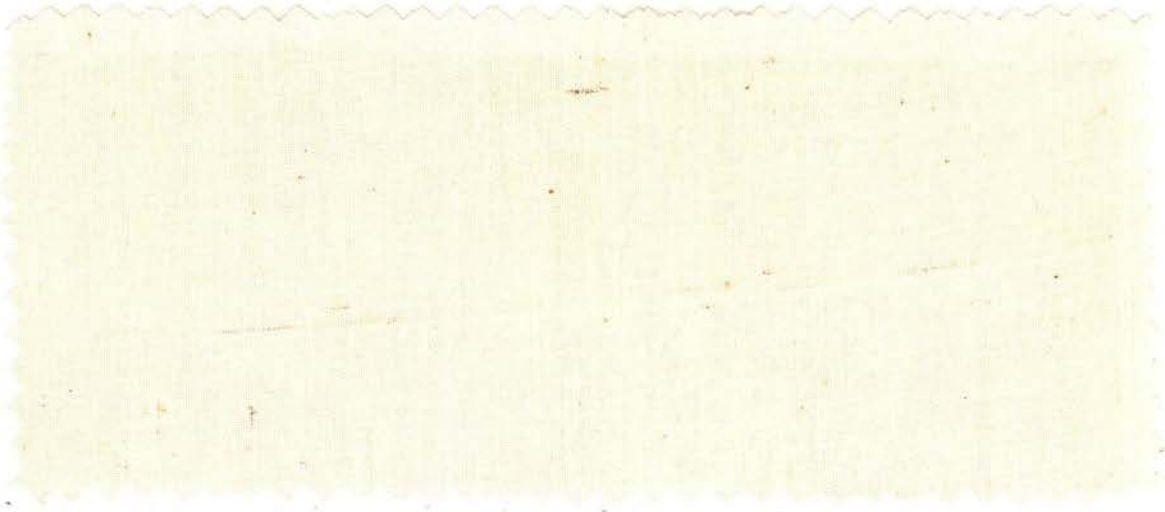


Figure 21. Plain Unbleached Muslin



Figure 22. Batiked Unbleached Muslin

more brightness and depth of color.

However, muslin with all of the wax removed can have a nice, matte quality with bright, opaque colors. The author has found that muslin without any wax remaining in it is excellent for throw pillows, men's ties, wallhangings, and drapery.

Therefore, muslin is a sturdy, inexpensive, versatile fabric offering many possibilities for batikking.

### Percale

Percale is a smooth-finished, plain weave cotton of light to medium weight which comes in a variety of colors or prints (figure 23). The author has found percale to be suitable for batikking light weight clothing, but has personally preferred other fabrics for wallhangings, and pillows.

When the author has worked with percale she has not washed it first. The dyeing quality of it has varied with the individual piece. Those pieces that are rather dull to begin with have consequently, given dull batikked colors. Also the "crackle" has not been as precise or sharp a "crackle" as with sheerer fabrics but is sharper than that of heavier fabrics (figure 24). Those percale fabrics with more sheen (due to fiber treatments such as mercerization) give richer more lustrous colors and the achieved "crackle" is not as fuzzy in appearance as that of the duller percales.

Wax penetrates easily without running and dye is absorbed to intense colors in five to twenty minutes.

The author has found that batikked percale clothing has a tendency to not wrinkle as badly after it is batikked.

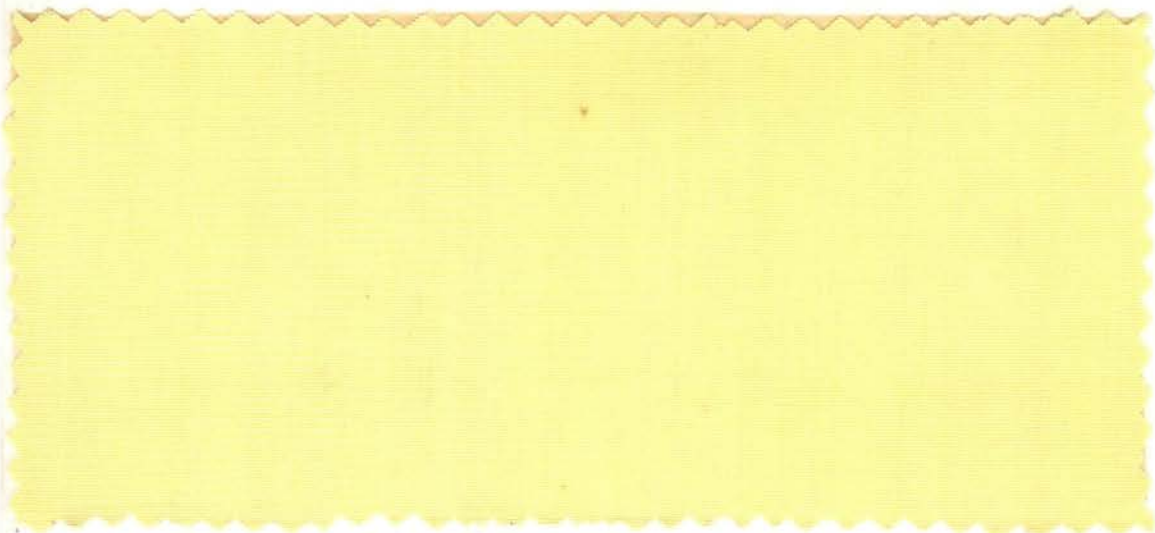


Figure 23. Plain Percale Fabric



Figure 24. Batikked Percale Fabric

### Sateen

Sateen is basically different from muslin and percale in that it is a satin weave fabric rather than a plain weave one. The satin weave allows for a thread to float over several other threads causing greater sheen to occur; the warp count is always lower than the filling count. It is a soft, smooth, light-medium weight lustrous fabric. It is used for linings, draperies, and dresses (figure 25).

Cotton sateen also has certain fillers added to it to give it body; therefore, if washed first, it will absorb the dye more readily. Sateen's absorptive power is great and it dyes relatively fast (five minutes for a medium shade) and it allows easy wax penetration giving a variety of types and amounts of "crackle".

After sateen is batikked it generally loses some of its luster, especially if any of the wax is left in it (figure 26).

### Polished Cotton

Polished cotton is basically percale that has been treated with a resin finish to give it a shiny luster (figure 27).

When trying to dye polished cotton, whether it is washed first or not, it is very difficult to get the dyes to take and to give deep colors. When it is dyed, the shinier side of the fabric will repel the dyes to a large extent and one can usually obtain light values. The colors are much lighter than one normally would get with other fabrics and the colors are slightly neutralized (figure 28).

Because of this resin finish, this fabric takes longer to dye but although difficult to dye one can still obtain subtle "crackle". The dyeing procedure, waxing procedure and wax removal procedures are the same as for the other fabrics mentioned.



Figure 25. Plain Sateen Fabric



Figure 26. Batiked Sateen Fabric



Figure 27. Plain Polished Cotton Fabric

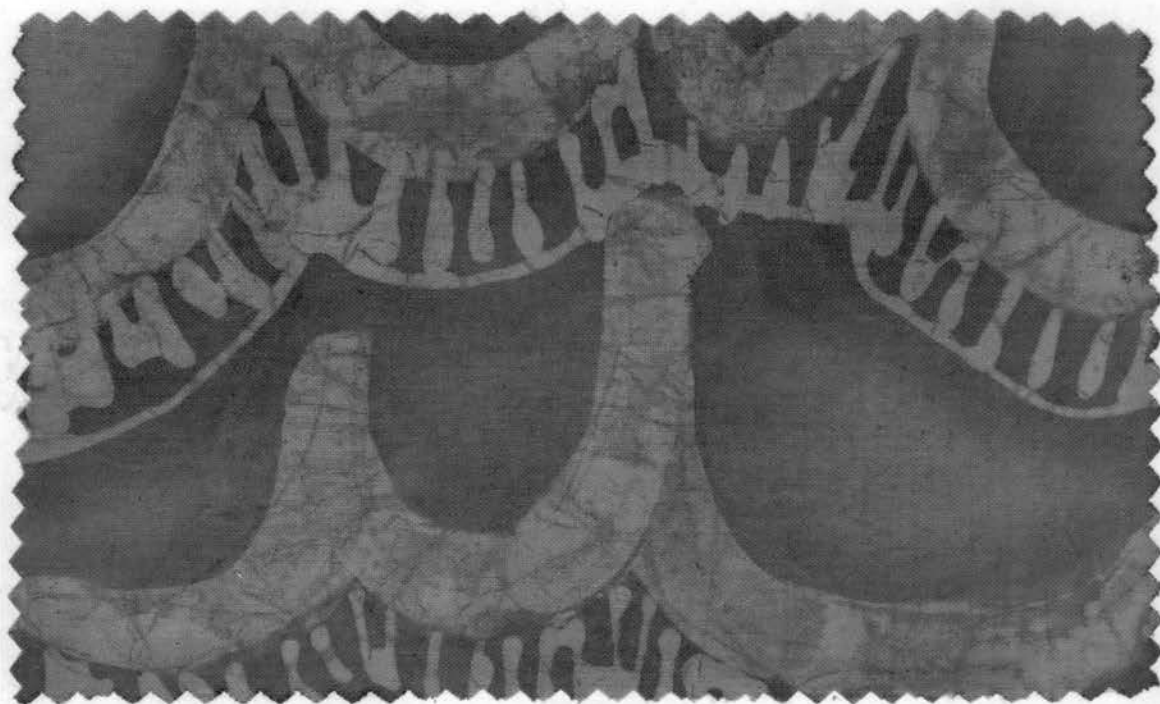


Figure 28. Batikked Polished Cotton Fabric



The finished, batikked polished cotton fabric generally retains some of the stiffness of the original fabric and the sheen. The author usually uses the shinier side of the fabric as the wrong side.

### Pique'

Pique' is a corded, medium weight cotton cloth in which the cords can run lengthwise in a ribbed effect or can give a patterned effect known as "birdseye" or "waffle". It can come in all colors; however, it is most often considered as being white and usually costs approximately two dollars a yard (figure 29).

Like the sheer ribbed cotton previously mentioned, the pique' patterning can provide an interesting texture over which to batik. When deciding on the design, this texture must be considered and a harmonious design applied over it.

The author has actually only worked with pique' once. At that time she first dyed it a soft yellow shade leaving it in the dye bath for approximately 15 minutes. She found that variations in color that occurred between a piece dyed for five minutes and one dyed for 15 minutes were extremely slight. By observation then, it appeared that pique' was slightly more difficult to dye than some of the other cotton fabrics.

After the areas to remain the yellow color were waxed and the fabric dipped into the second, dark brown dye, the author found that dark shades were difficult but not impossible to get.

She also noted that the brown dye tended to stick to some of the yellow waxed areas. Those waxed areas where the author had wiped the dye off remained the original color after dry cleaning. Those areas where she had left the dye on the wax and it had dried there, actually

had brown markings on them after the piece was dry cleaned. Therefore, from this one instance, it appears that because of the texture of the fabric the dye tends to stick to the waxed areas rather than running off. Generally, the combined texture, pattern and dye shadings on the wax can give a very interesting effect (figure 30).

In this particular instance, when the author used pique<sup>1</sup> she wanted very little "crackle"; therefore, that which occurred accidentally through handling was all that was present in the finished piece. Because of the texture, the "crackle" is not as precise as that obtained with smoother fabrics.

#### Oxford Cloth

Oxford cloth is a medium-heavy, basket-weave fabric (figure 31). Because it is heavier, wax penetration is a little more difficult than with some of the lighter weight fabrics; however, it accepts the dyes very well giving clear, intense colors. With a small portion of the wax remaining in the fabric, it has a very subtle sheen.

From all indications, oxford cloth is an excellent fabric for batikking (figure 32).

#### Denim

This medium-heavy twill weave cotton fabric (figure 33) has also been used by the author for batikking. After being washed to remove fillers or starches, the first wax layer was applied. Because of the heaviness of this and the tightness of the weave, it is difficult to get good wax penetration by applying it only to the front side.

The dyeing is fairly successful because the fabric takes the dye readily enough but does not develop into intense shades. Generally,

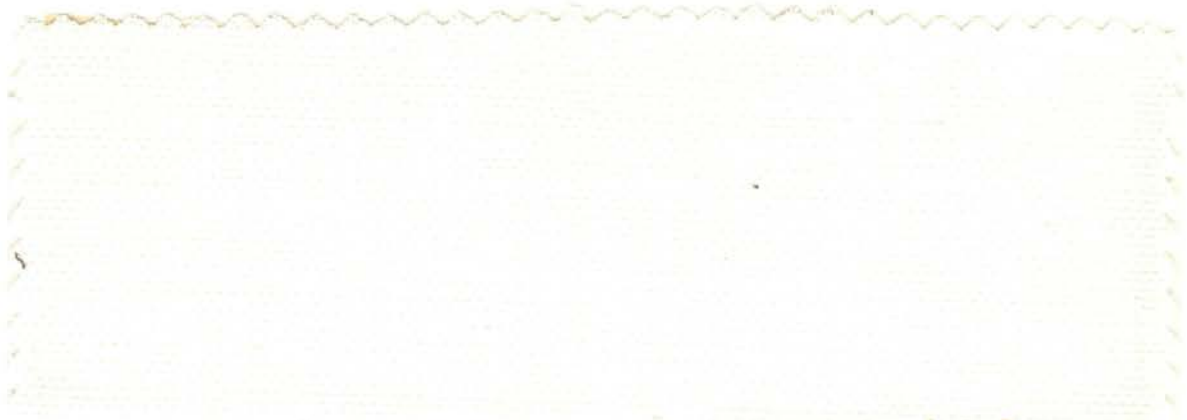


Figure 29. Plain Pique' Fabric



Figure 30. Batikked Pique' Fabric

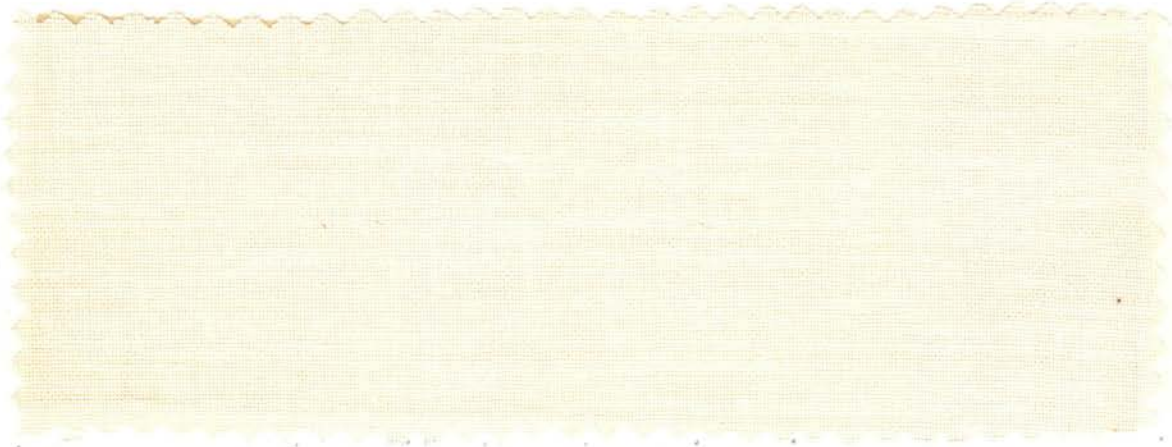


Figure 31. Plain Oxford Cloth Fabric



Figure 32. Batikked Oxford Cloth Fabric

denim colors are drab and dull (figure 34). The "crackle" one obtains is a soft, unprecise one.

### Sailcloth

A third medium-heavy weight cotton fabric the author has used for batikking is sailcloth. This fabric has two warp yarns for every filling yarn and has a smooth, sturdy appearance (figure 35).

Mostly, this fabric has been used by the author for batikking clothing and it is often purchased in a light shade. The achieved colors have been quite bright and true; however, the "crackle" has been less intricate or sharp-looking than that of the lighter weight fabrics. Similar to pique', the dye also tends to stick to the waxed areas (figure 36).

Because of the weight of this fabric, the author suggests professional dry cleaning when removal of all the wax is necessary (i.e. for clothing) or desired.

### Homespun

Homespun is a plain weave fabric composed of large, loosely twisted yarns; consequently, it is not nearly as tightly woven as plain weave fabrics with more tightly twisted yarns (figure 37). It is normally 45 inches wide, comes in numerous colors and usually costs about one dollar and fifty cents a yard.

More wax is required because of the greater absorption of the loosely twisted yarns and because of the thickness of the fabric; therefore, wax penetration is more difficult with this fabric. However, it will dye quickly (immersed or brushed) and will give a soft-looking crackle (figure 38).

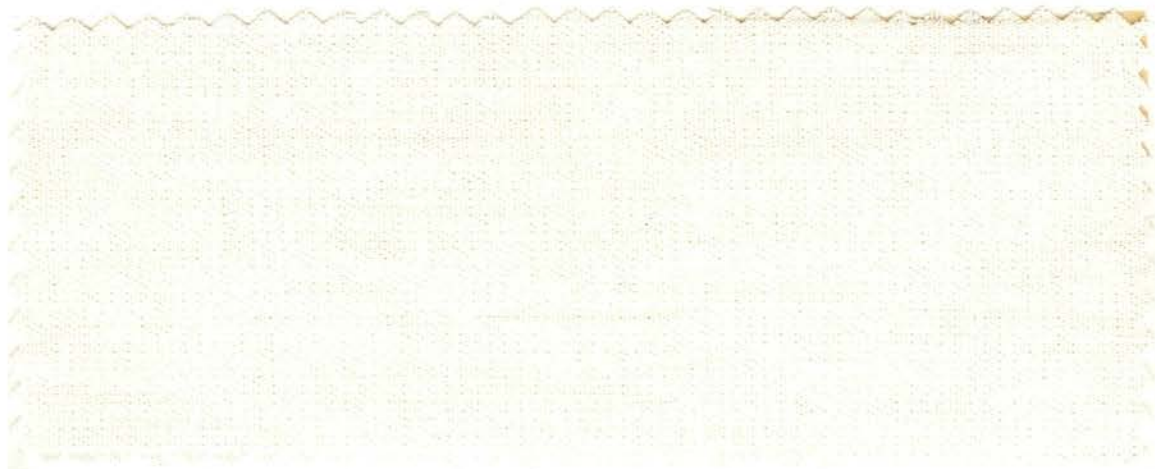


Figure 33. Plain Denim Fabric



Figure 34. Batiked Denim Fabric



Figure 35. Plain Sailcloth Fabric



Figure 36. Batikked Sailcloth Fabric

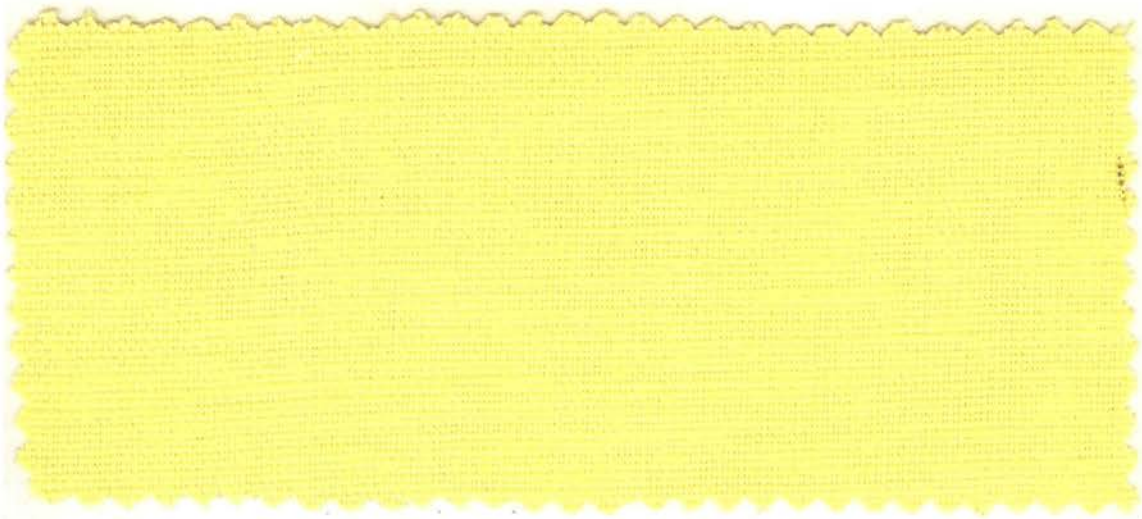


Figure 37. Plain Homespun Fabric



Figure 38. Batikked Homespun Fabric



The author has found this fabric is excellent for removing either the warp or filling threads after it is batikked. This characteristic enables one to obtain open spaces within the batik giving a hand-woven effect to the fabric.

The removal of all the wax from this fabric is also difficult unless done by professional dry cleaners.

### Osnaberg

Osnaberg is a coarse, natural colored plain weave fabric of medium-heavy weight (figure 39). As with the other heavier fabrics mentioned, wax penetration is more difficult and the "crackle" less specific. It will absorb the dye rather easily by being immersed in it but does take longer to achieve deep, intense colors. Dye which is brushed on usually needs to be reapplied several times to get the desired shade unless the dye is extremely concentrated.

The author has found that the major problem with this fabric is that when the wax is removed, it has a dull, lifeless quality to it and it generally is not very pliable because it retains a certain sticky stiffness to it (figure 40).

### Terrycloth

Terrycloth is the well-known fabric used most often for towels. It is a thick, unclipped loop pile fabric and it is extremely absorbent (figure 41).

Wax penetration is difficult and requires larger amounts of wax than any of the previously mentioned fabrics. It requires application upon application of wax to both sides of the fabric. Once waxed, it is almost impossible to bend or crack due to its bulkiness and thickness;

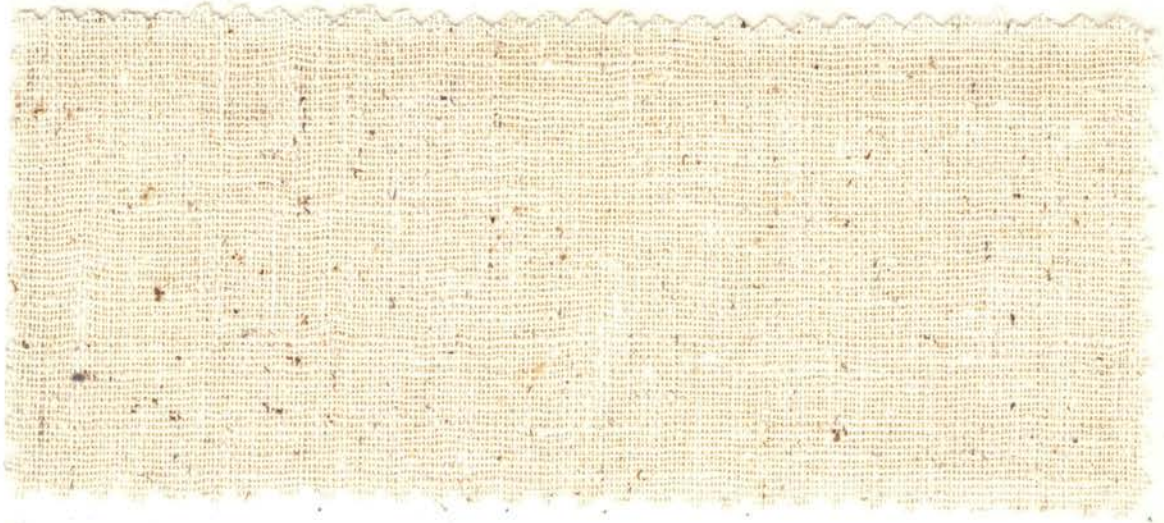


Figure 39. Plain Osnaberg Fabric



Figure 40. Batticked Osnaberg Fabric

consequently, it is almost impossible to get "crackle".

The fabric will dye immediately giving very deep colors. As with other textured fabrics, the dye will stick to waxed areas (figure 42).

### Velveteen

Velveteen is a cut pile fabric which is woven of cotton, linen, silk or cotton-synthetic blends (figure 43). The author normally batik dresses, wallhangings, or pillows on cotton velveteen; however, she feels that linen or silk velveteens would work beautifully. Cotton velveteen is normally 36 inches wide and usually costs approximately three dollars a yard.

Unlike most fabrics used to batik, velveteen should never be washed first. If for some reason it does not want to take the dye, it may have to be dry cleaned first; however, it would be much better if the fabric were tested for dyeability first. Then, if it would not dye, it should be rejected for another piece.

If the piece is dry-cleaned first, the author has found that there is a much greater chance for the nap to be flattened by the wax and for less "crackle" to result. She can only speculate that if dry-cleaned first, the fibers may tend to absorb more wax and consequently, require heavier applications of wax than normal to get the piece to a stiffness at which the wax would crack readily.

The author applies the design heavily to the nap side of the velveteen because if it is not applied heavily the charcoal will wash off the velveteen.

She then proceeds to wax the fabric from the nap side. Because of the great absorbency of the fibers, larger quantities of wax are required because the wax does not cover as large an area as with



Figure 41. Plain Terry Cloth Fabric



Figure 42. Batikked Terry Cloth Fabric

smoother fabrics. It is very important with all batiks but especially with velveteen that on large unpatterned areas one applies the wax so that it relates to the overall design. For instance, if one is waxing a large, plain circular form, how one wants this circle to look after it is dyed should be considered. The dye (especially with velveteens or other napped or texturous fabrics as previously noted) will stick to those areas where the wax is the thinnest causing shadings and streaked effects in the plain area (figure 44). These results can be very exciting if planned and the wax applied in a way that these shadings and streaks will reinforce the overall design.

Velveteen fabric dyes beautifully and immediately without waiting. It can simply be pulled through the dye very quickly and will normally achieve the desired color.

The "crackle" one can get with velveteen varies from the very subtle to the quite intense; however, the latter type of "crackle" generally requires great crushing of the waxed fabric in order to obtain it.

When ironing out the wax in velveteen, one proceeds as with any other fabric except great care should be given to not ironing in any wrinkles or pressing severely on double thickness areas (i.e. a dart in a dress). If a wrinkle is ironed in, it will stay in even after dry cleaning. If a double thickness area is pressed too hard a shiny spot can be the result.

The author always has her velveteen batikked items professionally dry-cleaned and she has always had excellent results with the pile raising back up.

Basically, velveteen presents batik results quite unique to that

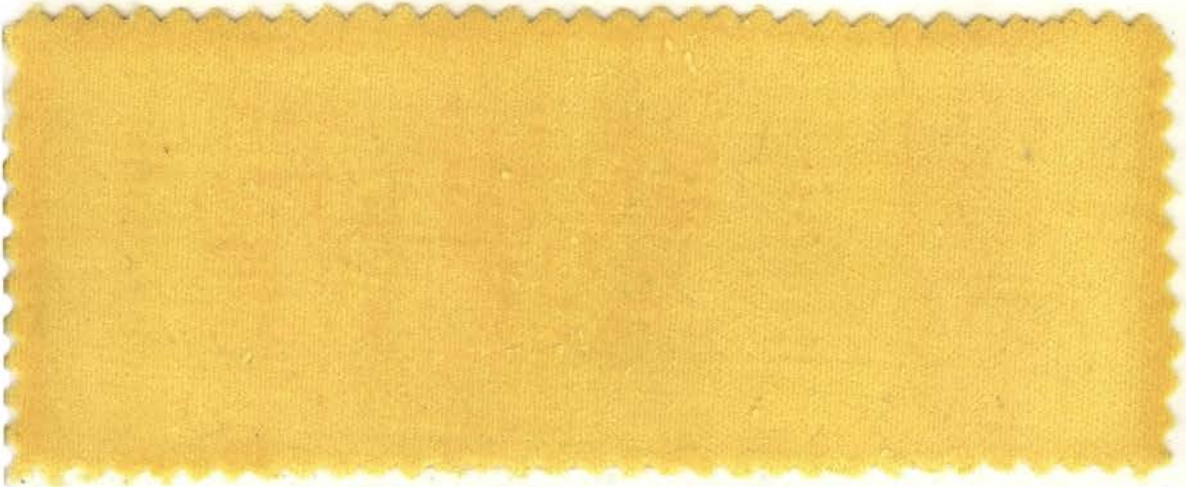


Figure 43. Plain Velveteen Fabric

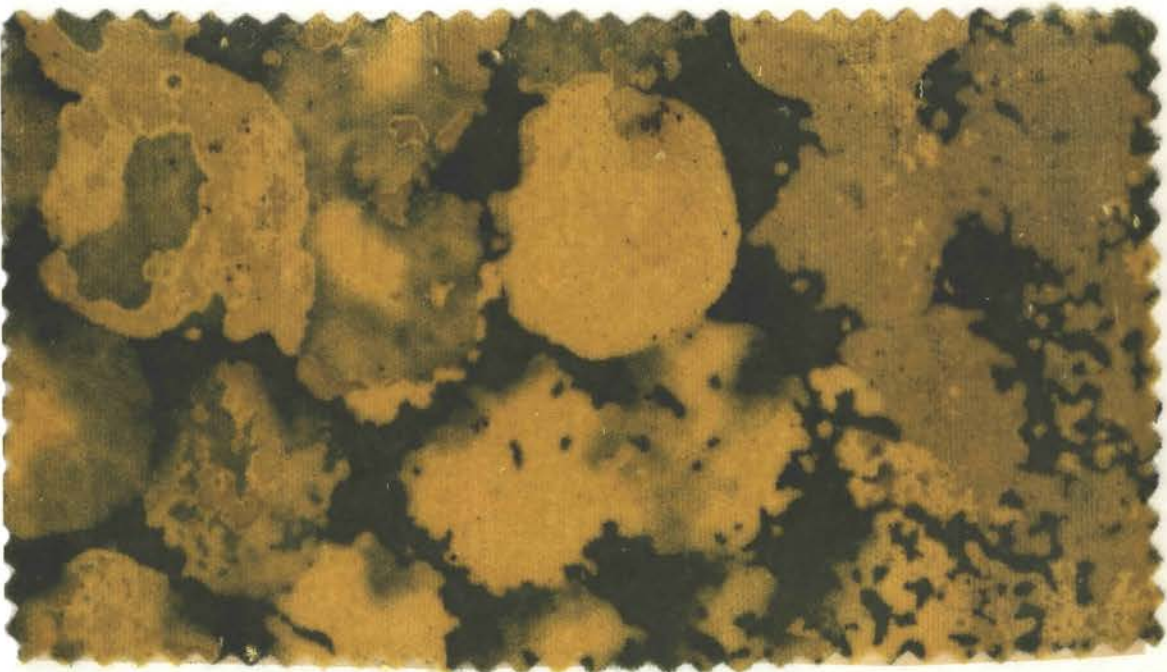


Figure 44. Batiked Velveteen Fabric

fabric. The sheen, the nap, the design and the "crackle" all add up to spectacular results.

### Flax

The second category of cellulosic fiber fabrics the author has batikked are those composed of 100 per cent flax fiber--linen.

Linen fabrics can vary from very light weight to extremely heavy. The author has worked with fabrics of light and medium heavy weight; sheer linen broadcloth, napkin linen and linen canvas.

#### Sheer Linen Broadcloth

Sheer linen broadcloth is a smooth-looking, firmly woven fabric with tight to medium-tightly twisted yarns (figure 45). The particular fabric the author has used has horizontal slubs and a very high sheen. It also has very good body.

There is very little problem with wax penetration; however, the very hot wax does run or spread when applied to this fabric. This fabric may be crushed relatively easy when it is waxed and a sharp, jagged "crackle" may be obtained.

In regards to dyeing, linen is more difficult to dye than cotton. When immersed in liquid, the liquid tends to spread across the surface of the fabric ("wicking") instead of being absorbed into the fabric. Consequently, dyeing this fabric is more time consuming. To combat this characteristic, the author uses concentrated dyes. With them, a light-medium value of color may be achieved in two to three minutes where a dark value may take ten minutes. If the fabric is mercerized, dye absorption will be improved.

The end results of batikking on this fabric are very handsome. The batik has a very precise "crackle", attractive texture and a beautiful sheen (figure 46).

#### Napkin Linen

The particular napkin linen used by the author is in many ways similar to the linen canvas except it is a smoother fabric with more tightly twisted yarns (figure 47).

Wax penetration is relatively difficult but the wax does not tend to run or spread when applied. The fabric is very stiff and bulky when waxed and is difficult to bend and crush in order to get a fine type of "crackle". Instead, the "crackle" is usually softer-looking and actually larger in scale than that obtained on lighter weight, sheerer fabrics.

Unlike the sheer broadcloth fabric, this linen has usually accepted the dye rapidly, giving bright, true colors (figure 48). It is probable that this fabric was mercerized and this is why dye absorption was improved.

Removal of all the wax from this fabric is difficult.

#### Linen Canvas

Linen Canvas is the heaviest weight of linen the author has batikked. It is a plain weave, smooth, firmly woven fabric with loosely twisted yarns (figure 49).

Generally, this fabric reacts to the batikking process very much in the way that the napkin linen does (figure 50).





Figure 45. Plain Light Weight Irish Linen Broadcloth



Figure 46. Batikked Light Weight Irish Linen Broadcloth

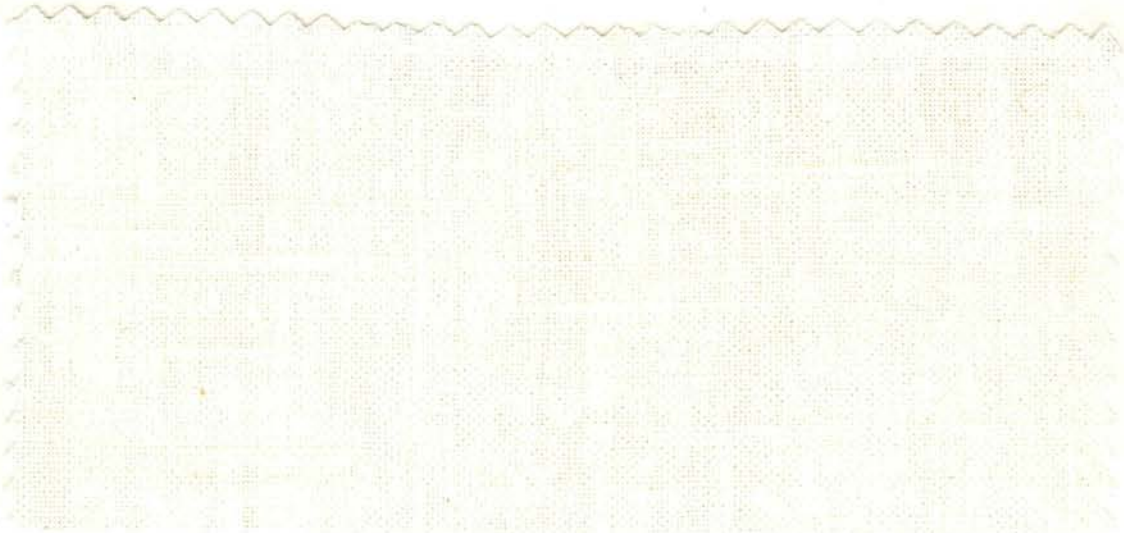


Figure 47. Plain Napkin Linen



Figure 48. Batiked Napkin Linen



Figure 49. Plain Linen Canvas Fabric



Figure 50. Batiked Linen Canvas Fabric

## Jute

Jute is the weakest cellulosic fiber when dry; therefore, it must be spun into coarse yarns. It is difficult to bleach white because it disintegrates in strong bleaches; therefore, it is often used in its natural color.

## Burlap

Burlap is a thick and absorbent fabric making wax penetration very difficult; if the wax is very hot it is possible to still wax fine lines (figure 51). Once waxed it is very bulky and difficult to crush in order to get sharp cracked areas in the wax; therefore, it is very difficult to get "crackle". It dyes instantly giving intense colors. (figure 52).

Generally, burlap is a messy, ravelling fabric with which to work and can give successful batik results only with great efforts by the batik artist.

## Rayon

Rayon was the first man-made fiber. Because it is a man-made fiber its appearance can vary quite drastically and consequently, the appearances of rayon fabric are many. Most rayon has an affinity for cotton dyes. It can even dye easier than cotton because it is 100 per cent pure cellulose and is more absorbent.

Two types of rayon fabric have been batiked by the author: Chiffon and Undercurrent lining material.

## Chiffon

Numerous, inexpensive rayon chiffon scarves can be found on which



Figure 51. Plain Burlap Fabric



Figure 52. Batiked Burlap Fabric

to batik (figure 53). They are very sheer; therefore, wax penetration is quite easy but it will run slightly. In almost every instance, the author has had excellent results with rayon chiffon accepting the dye rapidly and giving intense colors. A beautiful, sharp, profuse "crackle" can be obtained by crushing the fabric into a ball, straightening it, then immersing it into a final dark dye bath (figure 54).

The same waxing and dyeing process outlined in Chapter Two is used by the author. Part of the wax is easily removed through ironing the fabric between newsprint and the remaining wax is removed easily and quickly by dry cleaning.

The softness, sheerness and drapeability of this fabric makes it a very good fabric to batik and generally the results are quite beautiful. Dresses, scarves and wallhangings are just a few examples of items that may be made from batikked chiffon.

#### Undercurrent Lining

Undercurrent rayon lining material is a sheer but crisp material. It comes in a variety of colors and has a subtle sheen to it (figure 55). Wax penetration is excellent without running and a sharp, jagged "crackle" can occur which the author has found to be unique to this fabric. It dyes quickly giving clear, bright colors (figure 56).

The stiffness of this fabric would not allow it to be used for any items requiring drapeability; therefore, it is suitable for wall hangings, some clothing and possibly pillows.

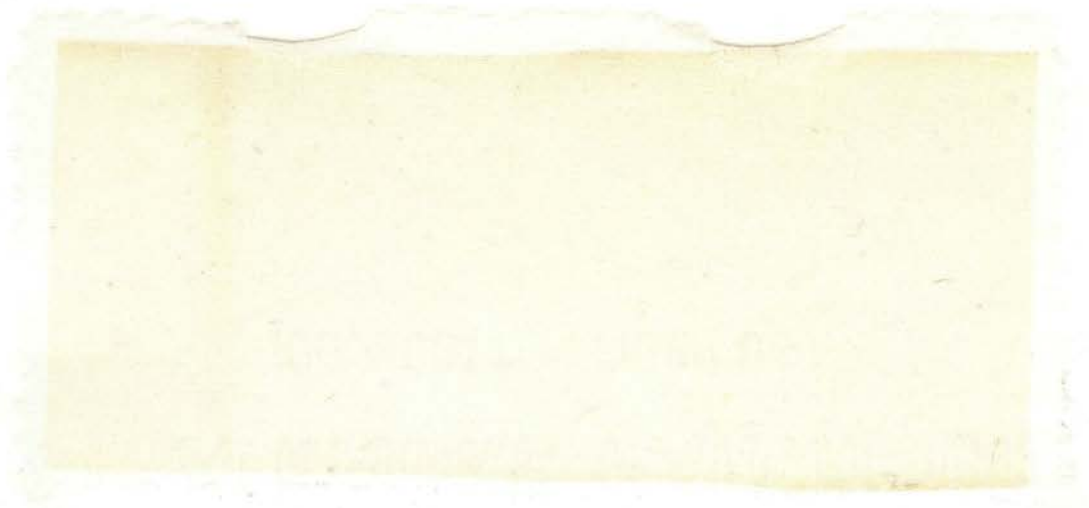


Figure 53. Plain Rayon Chiffon Fabric



Figure 54. Batiked Rayon Chiffon Fabric



Figure 55. Plain Rayon Undercurrent Lining Material



Figure 56. Batikked Rayon Undercurrent Lining Material



## CHAPTER 1V

### PROTEIN FIBER BATIKS AND BLENDS

The author has batikked fabrics composed of two types of protein fibers: silk and wool. She has experimented with silk chiffon, China silk and silk shantung, wool felt and wool sheer fabric.

#### Silk

Silk is believed to have been discovered and first used in China in 2640 B.C. and since that time has been considered as the "queen of the fibers" (9). Silk is the only natural filament fiber and can be 300-1800 yards long. It is smooth, resilient, and strong and has a wonderful luster to it which gives a finished silk batik added beauty.

#### Silk Chiffon

Silk Chiffon is a very sheer, transparent, gauzy, plain weave fabric made of highly twisted yarns. It is extremely drapable and soft. (figure 57).

Wax penetration offers no difficulties with this fabric; however, the fabric will tend to "squirm" when one is trying to apply the waxed design, making it more difficult. If the fabric is in a stretcher this problem is eliminated. When waxed, this fabric may be crushed easily and immersed in dye to get a beautiful, fine delicate "crackle".

The author has found that this fabric dyes very quickly (two to three minutes) giving bright, intense colors. Because of the sheerness

of this fabric and the consequent light penetration, the value of a color should be slightly darker than what appears to be the desired color.

The end batik result is intensely colored, soft, lustrous, and finely "crackled". The Author usually steams these pieces with vinegar (acetic acid) to set the dye and give the silk a rustling property known as "scroop" (figure 58).

### China Silk

China silk is a plain weave, thin, light weight fabric that is most often used for lining clothing. It is usually 36 inches wide and costs approximately two dollars a yard (figure 59).

The waxing procedure is identical with that of the silk chiffon and the "squirming" property is also a problem with this fabric. A profuse but delicate "crackle" may be obtained on this fabric also.

Longer periods of time (five to twenty minutes) are required to dye this fabric than the chiffon because it does not appear to absorb the dye as quickly. Because of this characteristic, dye streaks may be obtained on the fabric if one is not extremely careful. It must also be dyed darker because its colors appear lighter when the light penetrates the fabric (figure 60).

Acetic Acid is again used for setting the dye and for producing "scroop".

### Silk Shantung

Silk Shantung is a plain weave fabric characterized by heavier rough-textured, crosswise yarns. It is also relatively light weight but does have much more body than silk chiffon or china silk. It us-

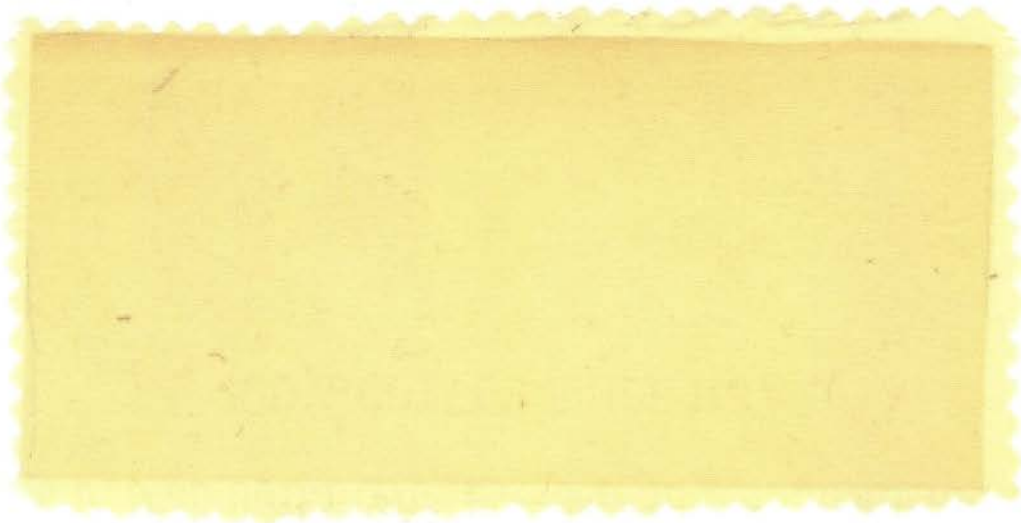


Figure 57. Plain Silk Chiffon



Figure 58. Batiked Silk Chiffon



Figure 59. Plain China Silk



Figure 60. Batiked China Silk

usually costs three dollars a yard (figure 61).

Unlike the previous two silk fabrics the author has batikked, shantung does not "squirm" badly when waxed. It will also produce a fine "crackle" but not nearly as delicate as that of the first two silk fabrics discussed. Shantung appears to dye more quickly than the China silk; therefore, it is more like the chiffon in this instance.

Basically, shantung is an easily waxed fabric that dyes easily giving vivid colors, and intense "crackle". Although an expensive fabric, the end results are usually very handsome and well worth the additional expense (figure 62).

#### Wool

Wool is a very ancient fiber. As far back as the second stone age, man knew of wool; and as early as 3,000 B.C. the Babylonians were spinning and weaving wool cloth (9). Wool is a scaly fiber in appearance and is comprised of the protein keratin. It is also a weak fiber in regards to tenacity but is a very flexible fiber and is much more resistant to abrasion than cotton, linen, silk or rayon. Wool is also very resilient--more so dry than when wet.

One particular characteristic of most wool fabric that is very important to know when batikking is that it repels water but tends to pick up water vapor. When it is finally wet, it does not dry quickly and is very heavy due to the great amounts of liquid its fibers has absorbed. Also during the batik process, when heated by the wax and wet by the dye, the wool's scales tend to open and the fabric becomes fuzzy in appearance.



Figure 61. Plain Silk Shantung



Figure 62. Batikked Silk Shantung

### Sheer Ribbed Wool

One wool fabric the author has batikked is a 36 inch width, very sheer, vertically-ribbed, cream colored wool (figure 63). With this fabric, it is relatively easy to wax fine lines as well as large areas and the wax penetrates better than would be expected but occasionally, one must still apply wax to the back side of the fabric. The author was worried about the effect of the molten wax on the wool since heat and moisture will shrink wool. However, when the final batikked garment was dry-cleaned, there was no obvious harm to the fabric.

As mentioned above, wool repels water; consequently, slightly longer periods of time are needed to dye it. This applies to light shades as well as dark ones. When the fabric does become saturated with dye it has a fuzzy texture. As it begins to give up the dye the fuzziness disappears, although the finished batikked piece will be slightly fuzzier than the original fabric. It is possible to brush dye on wool but it "bleeds" very badly. Also many applications of dye are needed to reach the desired shade.

The author has never obtained any "crackle" when she has batikked on wool. It is her guess that once the shingled wool fiber is forced to open slightly due to the heat of the wax, it can continue to absorb much greater quantities of wax than most fabrics. The normal wax applications do not cause this fabric to become nearly as stiff as other fabrics; therefore, it is always slightly pliable and it is very difficult to get the waxed areas to crush or crack to form the fine canals which the dye must enter to form "crackle" (figure 64).

When the wax is removed from this fabric by ironing, the author suggests that less pressure be applied than usual. Again, the heat

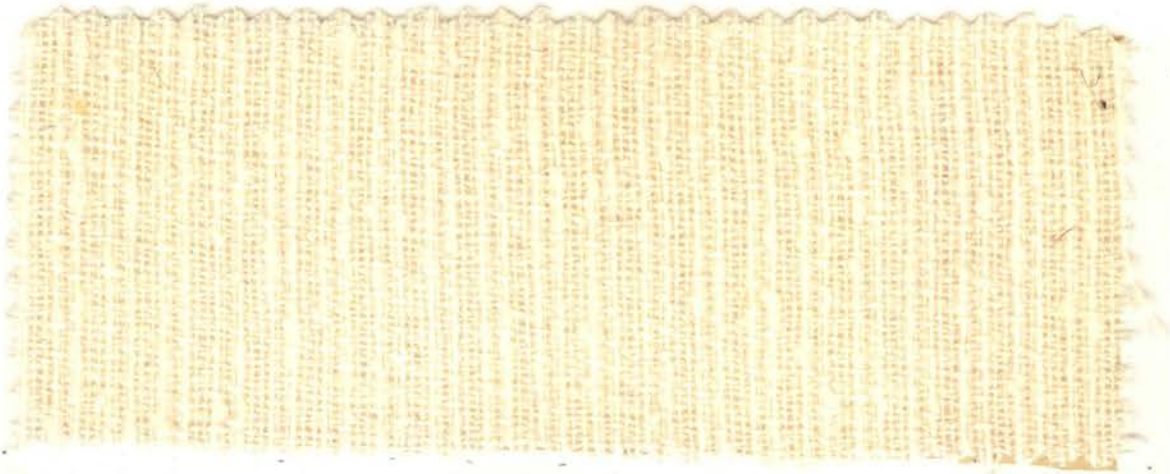


Figure 63. Plain Sheer Ribbed Wool



Figure 64. Batikked Sheer Ribbed Wool



from the iron and the melting wax causes the fiber's scales to open. If too much pressure is applied on this particular fabric it could become flattened in appearance destroying the ribbed effect. If any wax is left in this fabric after dry cleaning, it will also look flatter.

Basically, wool is more difficult to batik than any of those fabrics discussed thus far and it reacts quite differently from other fabrics throughout the entire process.

### Wool Felt

Wool felt is a non-woven fabric with a dull, flat finish (figure 65). The term "felting" describes the progressive shrinkage of wool done by subjecting the fibers to heat, moisture and friction (9). When treated in this manner, the fibers swell and their scales open slightly and become entangled as the fibers move. "They act like fishhooks and prevent further movement of the fibers, thus forming a matted fabric (9)."

Wool fibers and specialty wool fibers (i.e. mohair, angora, etc.) are the only natural fibers that will felt.

When batikking felt, complete wax penetration is very difficult to achieve; consequently, detailed, recognizable designs are difficult to get. Once waxed, the felt is relatively stiff but one can generally still feel the rough texture of the felt as one can feel the nap on waxed velveteen. It does not want to bend and crack; therefore, similar to the other wool fabric, felt has never given the author any "crackle". Unlike woven wool fabrics, dyeing felt is easy due to this rapid absorption which is probably due to the partially opened scales on the felt fabric.

Vivid, bright colors may be obtained with felt, but the author

does not believe that the finished felt batik is as handsome as batiks on other fabrics which allow more control of the design (figure 66). Wax is removed from felt by the usual process discussed in Chapter Two.

### Cellulosic and Protein Fiber Blends

There are vast numbers of fabrics comprised of both cellulosic and protein fibers. Of these, the author has investigated only a few.

#### Cotton and Silk Broadcloth

One such blend the author has batikked in a 93 per cent cotton and seven per cent silk blend. This fabric is a slubbed fabric of medium weight and comes in a wide variety of colors. It is a plain weave, 45 inches wide and sells for two dollars a yard (figure 67).

The author found that this fabric allows for wax to penetrate relatively easy but is very difficult to crack and bend in order to get "crackle", once the fabric is waxed. Consequently, the "crackle" one obtains is not very precise.

If one starts with lighter shades, this fabric dyes rapidly (two to five minutes) but if a medium value color is the starting color (figure 68) it is difficult to get darker shades and requires longer periods of time (ten to twenty minutes).

This fabric basically reacts to batikking like sailcloth, homespun or several of the other heavy cotton fabrics.

#### Silk and Rayon Organza

A second blend the author has experimented with is a 35 per cent silk and 65 per cent rayon organza. Organza is a plain weave, sheer, slightly stiff fabric which is used most often for evening dresses.



Figure 65. Plain Wool Felt



Figure 66. Batiked Wool Felt



Figure 67. Plain Cotton and Silk Broadcloth



Figure 68. Batiked Cotton and Silk Broadcloth

(figure 69).

Naturally, wax penetrates immediately and if the fabric is pulled up from the newsprint before the wax has completely cooled a mottled texture can be obtained in the wax. If "crackle" is desired, wax applications must be very heavy or be gradually built up; otherwise, the wax penetrates the fabric so completely that it is absorbed by the paper underneath, leaving very little on the fabric. With a fabric as sheer as this one, a frame may be advantageous to use.

When dyeing this fabric, it absorbs the dye readily but must be left in the dye for longer periods of time in order to reach deeper shades in order that light penetration does not completely "wash out" its color as it would with light shades (figure 70).

Although having only briefly experimented with this fabric, the author believes that it offers many possibilities for wallhangings and dresses and with experimentation very handsome results are obtained.



Figure 69. Plain Silk and Rayon Organza



Figure 70. Batiked Silk and Rayon Organza

## CHAPTER V

### SUMMARY AND CONCLUSIONS

This study has been prepared to give the reader a brief idea of the history of batik printing, to explain the difference between the ancient batikting technique and the contemporary batikting technique, to explain the skills and materials needed, and to present some of the most significant findings derived from the author's experimentation with this technique.

Batikking is just one of many ways to print fabric; however, it produces very unique, visually exciting results. It is possible that the batik wax resist technique and its related paste resist technique are among the most ancient methods of printing fabrics. The most ancient existing batik example is 1200 years old and is in Japan (5). It is believed that the batik process spread eastward from Egypt into Persia, India and Asia and southward into Africa (22). However, it is the people of Java who have mastered this technique to the greatest extent and it is Javanese terms that we apply today to this technique and its tools.

When one compares contemporary batiks and batik process with the ancient batik process, it is the Javanese technique that is being referred to as the ancient technique. The most obvious difference between these two techniques is the types of designs. The Javanese designs are traditional ones, comprised of minute, intricate lines and dots forming

geometric, floral and anamistic patterns. Contemporary designs are bolder and freer. There are no inherited patterns passed down from one artist to another. The entire procedure is approached more as one approaches a painting rather than the printing of fabric. This is perhaps due to the fact that contemporary batik artists most often batikked wall-hangings and other accessories for homes and buildings; whereas, the Javanese batik fabric by the yard to be used almost exclusively for clothing. Because of the different types of designs each produces, it is obvious that different tools would be used for applying the wax. The Javanese use "tjanting" tools or "tjab" stamps almost exclusively which produce the fine lines and dots characteristic of their batiks. Contemporary artists also use "tjanting" tools but usually only when combined with bolder brush strokes.

As well as different tools, the two types of artist also use different waxes and dyes and remove the wax and set the dye in different manners.

Generally, the tools required for batikking are inexpensive. The beginning batik artist only needs a surface on which to work, dye pans, a hot plate and double boiler, brushes and "tjanting" tool, a charcoal pencil, wax, dyes, dry cleaning fluid, and the fabric on which to batik. All of these items usually would not cost more than fifty dollars. Certain skills are also required. One of the most obvious, basic skills is the ability to do designs that are appropriate for this technique and which are actually well-designed entities. To have well-designed batiks the artist must have an understanding of all the Art Elements (color, line, texture, shape or form, space or void) and the Art Principles (harmony, balance, rhythm, emphasis and contrast). Because batikking



does involve the overlay of one transparent color over another, it is imperative that the artist have an understanding of color and their effects on one another. Another skill the author has had to obtain is the ability to batik in a small, restricted space without having disastrous accidents. As usual, the more one batiks and becomes familiar with the technique, the better are his results.

### Findings

As discussed in Chapter Three and Four, the author has worked with many types of natural fiber fabrics. The results obtained on each of these fabrics have been summarized in Table I.

There are also other findings which concern results obtained due to procedure more than results due to a specific fabric. First, in regards to wax, the author has found that the flexible petroleum wax Ultraflex works very well for batikting when combined in small amounts with paraffin. Ultraflex wax is very sticky and serves the same purpose that beeswax does when it is added to the wax mixture. That is, that it lessens the paraffin wax tendency to crack-off the fabric during handling. If only the Ultraflex wax were used, one would never obtain "crackle" because it is so flexible the waxed fabric could actually bend without cracking the wax. Another finding concerning the waxing procedure is the fact that when relatively sheer fabrics (i.e. wallpaper canvas) are waxed flat on sheets of paper and allowed to cool slightly, very interesting texture and "crackle" may be obtained when the fabric is pulled up from the paper. It was also discovered that by rewaxing an already waxed, dyed and "crackled" area, then redipping it in a dye, a "double crackle" could be obtained.

When experimenting with the dyeing procedure, it was noted that if the dye is allowed to drip dry in the fabric before being rinsed, darker shades are obtained much more quickly. The author has found that a dye formula of two packages of household dye to 21 cups of water is of sufficient strength to dye most fabrics. For more intense dyes, three packages of dye to 21 cups of water are used and for brushing on dye, to compensate for slower penetrations and less quality, a very intense dye mixture of one teaspoon to one cup of water is used. These dyes may be stored cold in plastic containers then used at any time in the future. Certain types of dyes store better than others as the dye storage table will show (Table II).

When removing the wax from the fabric by ironing, the author made few important discoveries other than noting particular care should be given certain fabrics such as velveteen and wool. She generally would suggest professional dry cleaning for complete wax removal from all batikked garments. Removal of all the wax from light weight silk or other fabrics may be obtained at home. With most wallhangings it is less important that all the wax be removed because the slight added body provided by the wax is sometimes beneficial.

The author did not find any new methods for setting the dye. Those methods she did use were salt added to the dye, vinegar added to the rinse water and later steamed into the fabric after dry cleaning, and the actual steaming process. Tannin-Mordants are one method which may be used for setting the dye but one which the author preferred to avoid. This technique may cause blood-poisoning if all the tarter emetic is not rinsed from the fabric.

### Future Research

The author has found that future research needs to be done within three areas of the batik process: wax formula experimentation, dye setting experimentation and synthetic fabric experimentation.

Due to the author's substitution of Ultraflex wax for beeswax and the subsequent results, it appears to her that many new and exciting results could be obtained through the use of different waxes. Each wax has a different melting point, a different degree of flexibility and other factors which might affect the batik. If a person were to do detailed experimentation with different waxes, some new ideas might be generated.

Experimentation with methods for setting dyes is also needed. Most batik artists find that poorly set dyes are one of the greatest disadvantages of this technique and can greatly hinder the uses for batiks. It would be ideal if large quantities of relatively inexpensive, extremely permanent dyes could be developed. Although certain more permanent dyes may be obtained when brushed on, large quantities of permanent dyes in which to dip large pieces are greatly needed.

Third, experimentation with synthetic fabrics could also be very useful to the batik artist because a great portion of fabrics today are synthetics or blends with synthetics. If dyes could be found which would dye these fabrics, a totally new category of fabrics could be available for batikking.

Generally, although this technique has existed for thousands of years and is practiced in many different ways, much research could still be done which would shed valuable information on the subject.

TABLE I  
BATIKKED FABRIC RESULTS

FIBER	FABRIC	TEXTURE OR WEIGHT	COLOR	WAX RESULTS	DYE RESULTS	NOTES	USES
(1) Cotton	Wallpaper Canvas	Sheer, light weight Soft	Natural	Easy penetration; fine, delicate "crackle"	Dyes quickly, intense colors	Wrinkles badly, must preshrink, must remove fillers, very soft "hand" when all wax is removed	Wallhangings, Drapery, Lining
(2) Cotton	Interfacing	Sheer, light weight	White, Natural	Easy penetration; fine, delicate "crackle"	Dyes quickly, intense colors	Smoother surface texture but stiffer than wallpaper canvas.	Wallhangings, Drapery, Lining
(3) Cotton	Voile	Sheer, light weight Stiff	All Colors	Easy penetration; Subtle "crackle"	Difficult to dye and get deep, intense colors	Gives Moire' illusion	Wallhangings, Dresses, Scarves
(4) Cotton	Sheer, Ribbed Cotton	Sheer, light weight	White	Easy penetration; slightly coarser looking "crackle"	Easier to dye than voile but more difficult than wallpaper canvas or interfacing	Plan design to work with vertical texture of fabric	Wallhangings, Dresses, Scarves
(5) Cotton	Unbleached Muslin	Stiff, light-medium weight	Natural	Easy penetration, delicate to coarse "crackle"	Dye may be brushed on without running or penetrating. May be dipped if washed first	Good body, bright colors when some was left in the fabric. Dull, matte colors when wax removed.	Wallhangings, Drapery, Pillows, Dresses
(6) Cotton	Percale	Slightly stiff, light-medium weight	All Colors	Easy penetration, fine to medium-fine "crackle"	Dyes relatively easy. Brighter, more lustrous colors when original fabric is smoother and more lustrous	Batikked percale wrinkles less badly than plain percale	Wallhangings, Drapery, Pillows
(7) Cotton	Sateen	Soft, light-medium weight	All Colors	Easy penetration, medium-fine "crackle"	Good absorption Intense colors	Looses some luster during process	Wallhangings, Pillows
(8) Cotton	Polished Cotton	Stiff, light-medium weight	All Colors	Easy penetration, very subtle "crackle"	Very poor absorption, difficult to dye. Gives light, neutralized colors.	Doesn't give good results	Pillows, Clothing
(9) Cotton	Pique'	"Birdseye" "Waffle" texture. Light-medium weight	All colors Most often white	Fairly easy penetration Medium-fine "crackle"	Harder to dye than muslin, percale or sateen. Dye sticks to waxed areas because of texture	Combined design and texture can be very pleasing	Clothing

TABLE I (CONTINUED)

FIBER	FABRIC	TEXTURE OR WEIGHT	COLOR	WAX RESULTS	DYE RESULTS	NOTES	USES
(10) Cotton	Oxford Cloth	Smooth, medium weight	White	Relatively easy penetration; medium-fine "crackle"	Dyes quickly giving intense colors	Smooth, lustrous effects	Wallhangings, Pillows, Clothing
(11) Cotton	Denim	Twill weave, medium-heavy weight	All Colors	Difficult wax penetration; less distinct medium "crackle"	Difficult to predict colors usually more neutralized results.	Dull finish	Clothing
(12) Cotton	Sailcloth	Stiff medium-heavy weight	All Colors	Difficult wax penetration; less distinct medium "crackle"	Quick dyeing, intense colors. Dye sticks to waxed areas	Bright intense colors smooth surface	Wallhangings, Clothing
(13) Cotton	Homespun	Coarse, medium-heavy weight	All Colors	May require wax applications on back. Medium coarse "crackle"	Dyes quickly and intensely	Good results. Good fabric for added special effects such as removing filling threads	Wallhangings, Clothing
(14) Cotton	Osnaberg	Coarse, medium-heavy weight	Natural	Difficult penetration; medium-fine "crackle"	Dyes relatively quick with less intense colors.	When wax removed, fabric is dull, stiff and retains slightly sticky feeling	Wallhangings, Pillows, Clothing
(15) Cotton	Terrycloth	Pile fabric, medium-heavy weight	All Colors	Very difficult penetration. Requires heavy applications. No "crackle"	Very absorbent, good intense colors	Difficult to get details	Wallhangings
(16) Cotton	Velveteen	Pile fabric with nap. Medium-heavy weight	All Colors	Relatively difficult penetration. Subtle to sharp "crackle"	Very absorbent. Intense colors	Beautiful sheen and "hand"	Clothing, Wallhangings,
(17) Flax	Irish Linen Broadcloth	Smooth, light weight	All Colors	Easy penetration. Jagged-looking "crackle"	Difficult absorption. Requires concentrated dyes	Beautiful sheen and "hand"	Clothing
(18) Flax	Napkin Linen	Smooth, medium-heavy weight	Natural	Difficult penetration medium-coarse "crackle"	Good absorption Bright colors	Mercerization improves dyeability	Wallhangings, Napkins, Clothing
(19) Flax	Linen Canvas	Smooth, medium-heavy weight	White	Difficult penetration Coarse "crackle"	Bright Colors	Relatively stiff when finished	Wallhangings

TABLE I (CONTINUED)

FIBER	FABRIC	TEXTURE OR WEIGHT	COLOR	WAX RESULTS	DYE RESULTS	NOTES	USES	
(20)	Jute	Burlap	Rough, medium weight	All Colors	Extremely difficult wax penetration, very little "crackle"	Very absorbent deep colors	Difficult to batik	Wallhangings
(21)	Rayon	Chiffon	Sheer, extremely light weight	All Colors	Immediate penetration Very fine "crackle"	Very good absorption and colors	Easy to batik, beautiful results	Wallhangings, Scarves, Dresses
(22)	Rayon	Undercurrent Lining	Smooth, light weight	All Colors	Good penetration; "crackle" similar to light-weight linen broadcloth	Poor absorption but bright colors can be achieved	Gives sheer crisp bright colors	Wallhangings, Clothing
(23)	Silk	Chiffon	Smooth, extremely sheer	All colors	Extremely easy penetration, very delicate "crackle"	Good absorption and bright colors	Beautiful results, easy to batik	Scarves, Clothing
(24)	Silk	China Silk	Smooth, very light weight	All Colors	Easy penetration	Slow absorption	Difficult to achieve deep colors	Wallhangings, Clothing
(25)	Silk	Shantung	Smooth with horizontal slubs, light weight	All Colors	Easy penetration, sharp "crackle"	Quick absorption, very bright colors	Easy to batik, beautiful results	Clothing
(26)	Wool	Ribbed Wool	Textured, light weight	White	Difficult penetration No "crackle"	Excellent absorption after a brief period of time. Full range of colors	Difficult to batik but can give very individualistic results	Clothing
(27)	Wool	Felt	Smooth, medium weight	All Colors	Very difficult penetration. No "crackle"	Excellent absorption and deep colors	Difficult to get details	Wallhangings
(28)	Cotton & Silk	Broadcloth	Smooth with horizontal slubs. Medium weight	All Colors	Relatively easy penetration; medium-fine "crackle"	Poor absorption, difficult to achieve deep colors	Difficult to batik	Clothing
(29)	Silk & Rayon	Organza	Smooth, very sheer	All Colors	Extremely easy penetration. Subtle "crackle"	Hard to get deep colors	Sheer, crisp batiks	Clothing

TABLE II  
DYE STORAGE RESULTS

Color	Aniline Dye (Caldye, Eaton)	Household Dyes (Rit, Tintex, Putnam)
Yellow	Yellow GGL (Caldye) - will usually retain strength 4-6 months	Gold (Rit) - will retain strength 4-6 months and will not begin to coagulate
Yellow Green		Chartreuse (Rit) - will usually retain strength 2-3 months Chartreuse (Tintex) - will become slightly coagulated in 1-2 months Chartreuse (Putnam) - will retain strength 3-4 months without coagulating Bronze Green (Putnam) - will retain strength 2-3 months without coagulating but will become browner
Green		Jade Green (Putnam) - will retain strength at least 4-6 months without coagulating
Blue	Blue GBL (Caldye) - will retain strength 4-6 months	Marine Blue (Rit) - will retain strength at least 4-6 months without coagulating Navy Blue (Rit) - will retain strength at least 6 months without coagulating
Blue Purple		French Blue (Putnam) - Retains strength at least 6 months
Purple		Purple (Rit) - will retain strength 4-6 months without coagulating Purple (Putnam) - will retain strength 4-6 months without coagulating
Red Purple		Fushia (Tintex) - will retain strength 3-4 months but will begin to coagulate Fushia (Rit) - will retain strength 4-6 months Mulberry - will retain strength 2-3 months then will begin to darken and become browner
Red	Union Bright Cardinal (Eaton) - appears to tend to coagulate quickly	
Red Orange		Henna (Putnam) - Retains strength 6 months at least without problems
Orange		Tangerine (Rit) - Retains strength 4-6 months without coagulating
Yellow Orange		
Black	Black GBL (Caldye) - Retains strength 6 months without coagulating	
Brown		Dark Brown (Rit) - Retains strength 4-6 months without coagulating

#### BIBLIOGRAPHY

- (1) Adams, Alice. "Batiks by Kawabata." Craft Horizons, XXII No. 1, (January, 1962), 14-15.
- (2) "Batik." Seventeen, XXI Pt. 1, (January, 1962), 84-85.
- (3) "Batik." Woman's Day, (April, 1966), 50-51.
- (4) "Batik-A Hobby Steeped in Tradition and Surprise." Living for Young Homemakers, XIV, (June, 1961), 76-79+.
- (5) Batik Designs and Colors. New York: American Fabrics, 1960.
- (6) Batik-Weaving and Linson Craft. Crafttool Catalog No. 63BW. Wood-Ridge, New Jersey: Crafttools Incorporated, 1963.
- (7) Birrell, Verla. The Textile Arts. New York: Harper and Brothers, 1959.
- (8) Fraps, G. S. Principles of Dyeing. New York: The Macmillan Company, 1916.
- (9) Hollen, Norma, and Jane Saddler. Textiles. New York: The Macmillan Company, 1955.
- (10) Kafka, F. J. The Hand Decoration of Fabrics. Bloomington, Illinois: McKnight and McKnight Publishing Company, 1959.
- (11) Knudsen, Thomas W. "Batiks." School Arts, LXIV, (May, 1965), 3-8.
- (12) Krevitsky, Nik. Batik Art and Craft. New York: Reinhold Publishing Corporation, 1964.
- (13) Lauterburg, Lotti. "Fabric Batik." School Arts, LXIII, (November, 1963), 33-37.
- (14) Lauterburg, Lotti. Fabric Printing. New York: Reinhold Publishing Corporation, 1963.
- (15) Lewis, Albert Buell. Javanese Batik Designs. Chicago: Field Museum of Natural History, Antropology Design Series No. 2, 1924.
- (16) "Maud Rydin Creates in Batik." Design, LXI No. 5, (May, 1960), 195-197+.



- (17) Meinecke, Ingeborg. "Batik Pictures of Ev Grueger." School Arts, LXI, (May, 1962), 33-34.
- (18) Mijer, Pieter. Batiks and How to Make Them. New York: Dodd, Mead and Company, 1928.
- (19) "Printed Cottons of Java." Craft Horizon, XXIII No. 6, (November-December, 1963), 28-32.
- (20) Proud, Nora. Textile Printing and Dyeing. New York: Reinhold Publishing Corporation, 1955.
- (21) Rossbach, Ed. "Contemporary Batiks." Craft Horizon, XIII No. 6, (November-December, 1953), 19-21.
- (22) Yates, Barbara A. "The Art of Batik in Indonesia." School Arts, LX, (January, 1961), 7-10.

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